VOL. LXXXII PART EIGHT

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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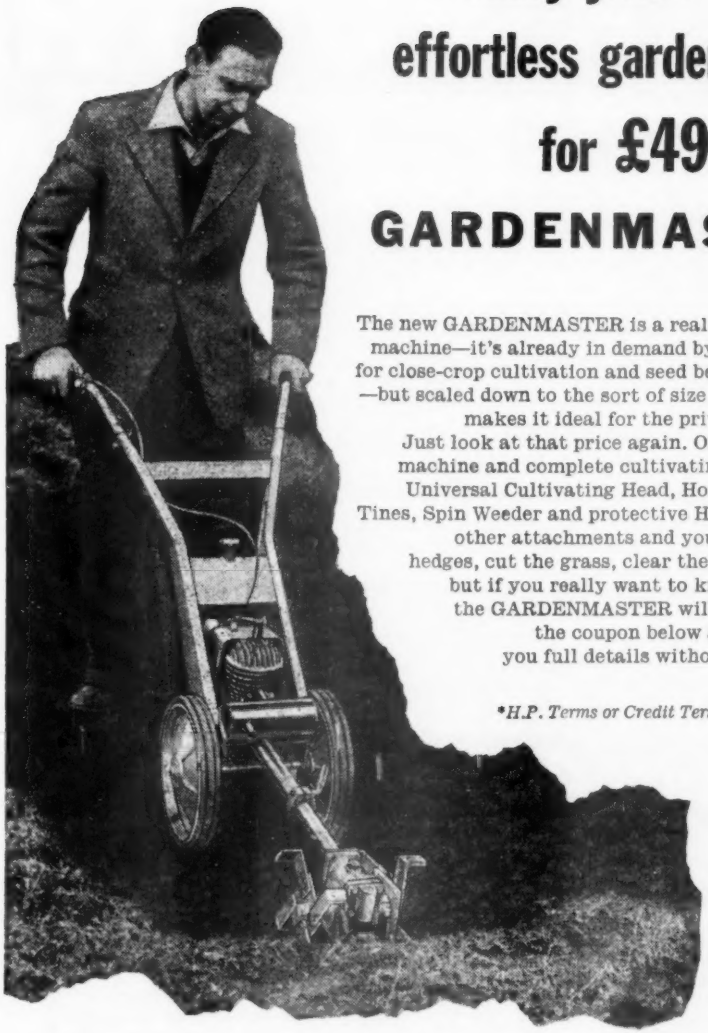

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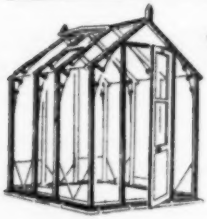

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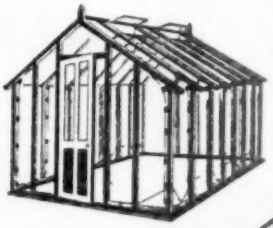

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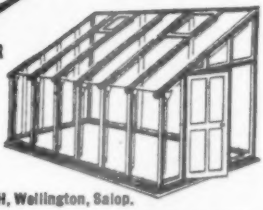

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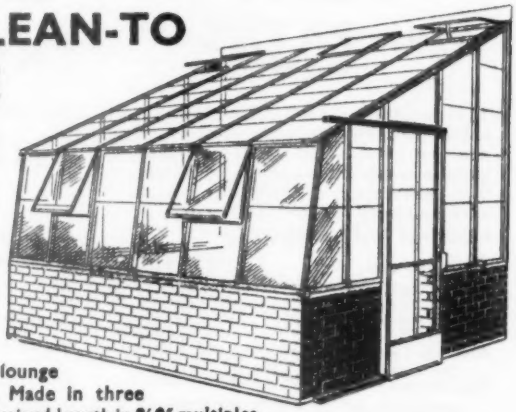

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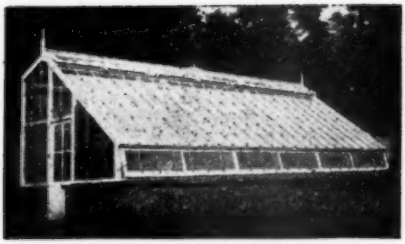

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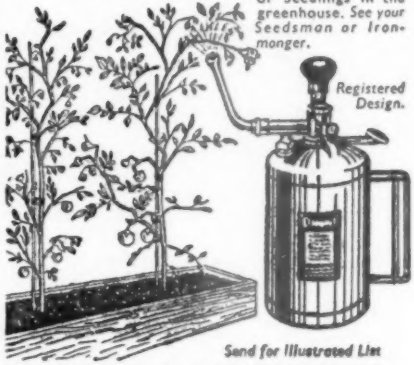

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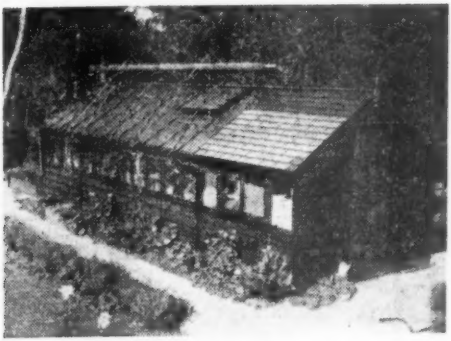

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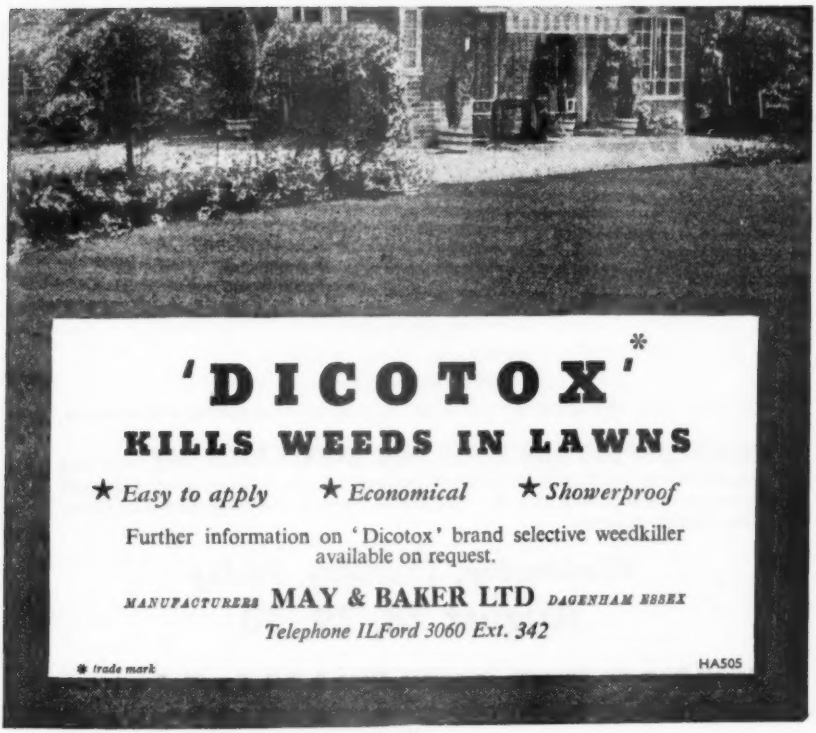

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXXII PART EIGHT

August 1957

THE SECRETARY'S PAGE

ANNOUNCEMENTS—AUGUST AND SEPTEMBER

Shows—The Shows are held in the Society's New Hall in Greycoat Street and/or the Old Hall in Vincent Square, Westminster.

TUESDAY, August 13 12 NOON to 6 P.M. WEDNESDAY, August 14 10 A.M. to 5 P.M.	Fortnightly Flower Show, in the New Hall. Gladiolus Competition, in the Old Hall.
TUESDAY, August 27 12 NOON to 6 P.M. WEDNESDAY, August 28 10 A.M. to 5 P.M.	Fortnightly Flower Show, Alpine Garden Society's Competition and Cactus and Succulent Society's Competition, in the Old Hall.
FRIDAY, September 6 1 P.M. to 7.30 P.M. SATURDAY, September 7 10 A.M. to 5 P.M.	National Dahlia Society's Show, in both Halls.
TUESDAY, September 10 12 NOON to 6 P.M. WEDNESDAY, September 11 10 A.M. to 5 P.M.	Fortnightly Flower Show, in the New Hall.
FRIDAY, September 13 11 A.M. to 7 P.M. SATURDAY, September 14 10 A.M. to 5 P.M.	National Rose Society's Show, in both Halls on September 13; in the New Hall only on September 14.

Shows—*(continued)*

TUESDAY, September 24 12 NOON to 6 P.M. WEDNESDAY, September 25 10 A.M. to 5 P.M.	Great Autumn Show, in both Halls.
FRIDAY, September 27 1 P.M. to 7.30 P.M. SATURDAY, September 28 10 A.M. to 6 P.M.	National Chrysanthemum Society's Show, in both Halls.

Lectures

TUESDAY, August 13, at 3 P.M. "Changing Fashions in Roses", by MR. G. D. ROWLEY, B.SC.

TUESDAY, September 10, at 3 P.M. "Growing Plants without Soil", by MR. D. FOXWELL.

TUESDAY, September 24, at 3 P.M. Masters Memorial Lecture. "The Water Requirements of Crop Plants in the United Kingdom", Part I, by MR. E. J. WINTER, M.C., M.SC.

Demonstrations at Wisley—On September 25 there will be a demonstration on Digging, Manuring and Composting, commencing at 2 P.M. The demonstration will be repeated at the same time on September 26.

Chelsea Show, 1958—Attention is drawn to the fact that in 1958 the Chelsea Show will be held on May 21, 22 and 23. The private view for Fellows and Associates will be on May 20.

Floral Arrangement Competition—There will be a Floral Arrangement Competition on Wednesday, October 2. Schedules may be obtained on application to the Secretary.

Fifteenth International Horticultural Congress—This Congress will be held in Nice, on the Côte d'Azur, France, from April 11 to April 18, 1958, under arrangements to be made by the National Horticultural Society of France. The theme of the Congress will be "Science in the service of horticultural techniques". There will be discussions, meetings of various sections, social functions and local excursions. Those who contemplate taking part in the Congress should notify The Secretary, 15th International Horticultural Congress, 84 Rue de Grenelle, Paris 7, France.

Second World Orchid Conference—This Conference, which is jointly sponsored by the University of Hawaii, the American Orchid Society Inc., and the Hawaiian Orchid Societies Inc., will be held in Honolulu, Hawaii, from September 19 to 23, 1957. It is intended primarily for the exchange of information and for the observation and comparison of orchid cultural techniques. The nomenclature and registration of orchid hybrids will also be discussed. There will be an exhibition

in which *Vanda* and *Dendrobium* hybrids are expected to be particularly prominent, and tours to some of the islands' outstanding gardens and orchid nurseries are planned. Full particulars may be obtained from DR. J. H. BEAUMONT, Chairman of the Joint Planning Committee, University of Hawaii, Honolulu 14, Hawaii.

Plants for Identification—Fellows often send specimens of plants to the Society's offices at Vincent Square for identification. As these are sent on to Wisley, where all technical inquiries are dealt with, Fellows are asked to send all specimens for identification direct to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey. They will then arrive in a fresher condition. For the same reason it is better to avoid having specimens in the post at weekends.

The Society's Examinations

General Examination Results 1957—At the General Examination in Horticulture, held on March 13, 1957, there were 817 candidates, of whom 558 were successful—61 being placed in Division I and 497 in Division II; 259 candidates failed to satisfy the Examiners.

At the General Examination in Horticulture for Juniors (those under 18 years of age on March 1, 1957) which was also held on March 13, 1957, there were 296 candidates, of whom 128 were successful; 168 candidates failed.

Both these Examinations consist of written work only.

The Preliminary Examination for the National Diploma in Horticulture will be held on Saturday, November 16, 1957. The closing date for entry is October 1, 1957.

NOTES FROM WISLEY

N. K. Gould

DURING the month the herbaceous borders head the list of attractions, but there are still many other good and interesting plants to be found in the rock garden, in the heath garden and in the greenhouses; while the collections of dahlias, chrysanthemums and other plants on trial will be at their best.

Ascending the steps opposite the main gate the visitor comes to the terrace, where many variegated and other varieties of pelargonium are displayed in the beds, together with heliotrope, abutilons and purple-leaved cannas, providing striking colour contrast. Turning left from the terrace it will be seen that the beds in which dahlias and chrysanthemums were formerly grown have now been replanted with herbaceous plants and shrubs, an arrangement which gives a long display and is more easily maintained than a border of herbaceous perennials alone.

Here may be seen some of the most up-to-date garden varieties of popular border plants.

Prominent in the areas which lie east and west of this walk are the trials of French and African marigolds in a wide range of colour and habit. These are excellent annuals for dry soils, revelling in brilliant sunshine. Similar conditions suit the zinnias, the trial of which is being repeated this year as the unfavourable weather of 1956 spoilt the earlier trial. Other annuals on trial include coreopsis, calendulas and annual carnations. The bedding varieties of dahlias are also planted in this area, although the tall-growing varieties are in new beds to the west of the restaurant.

The path crossing the Floral Trial Grounds leads directly to the rose borders, where many of the hybrid teas and floribunda varieties should be carrying a good crop of blooms. Running parallel to the rose borders there is the border of annuals, mostly sown *in situ*. The prolonged drought in the early summer has restricted their growth, but will not have adversely affected such lovers of sun as petunias, tropaeolums, ageratums and mesembryanthemums. From the annual border it is but a few steps to the Alpine House, and on the way the visitor may note a bed of the intense blue *Salvia ambigens* interplanted with *Hypericum* 'Rowallane Hybrid'. As usual gazanias occupy a prominent position near the house and will have reached their most floriferous period. In the narrow borders beside the walls many unusual flowers are to be found, and on sunny days none is more striking than the little violet *Specularia speculum*, known to many as "Venus's Looking Glass". Inside the house there are a number of late summer-flowering alpine plants. Several species of gentian are notable, especially the pale blue *Gentiana depressa*, which was collected by Messrs. LUDLOW & SHERRIFF in the alpine regions of the Himalaya. Some other good things are *Wahlenbergia matthewsii*, a pale china-blue species from New Zealand; *Amaracus pulcher*, with sage-green foliage and nodding rosy-purple heads; *Thalictrum kiusianum*, an admirable pot plant flowering for many weeks; *Calandrinia umbellata*, with flowers of vivid magenta-purple and *Allium cyaneum*, one of the most distinctive of the onion family, with clusters of blue flowers.

Blue is a dominant colour in the Rock Garden at the present season. A collection of gentians has been planted, many of which will be in flower, including the invaluable *G. septemfida* and *G. lagodechiana*. This is also the season for the trailing blue- or purple-flowered cyananthus, of which *C. microphyllus* and *C. lobatus* may be expected. Among the many other plants of merit are *Scabiosa graminifolia*, very free-flowering and of stature well suited to the rock garden; *Stokesia laevis*, with broad lavender centaurea-like heads; *Nandina domestica*, a small shrub with elegant divided foliage and long panicles of small ivory flowers, and several sedums such as *S. populifolium*, covered with pale pink blossoms and the useful variegated forms of *S. kamtschaticum* and *S. middendorfianum*. A quaint little plant growing at the edge of the bog garden is

Houttuynia cordata, which has neat heart-shaped leaves and tiny flower spikes each surrounded by four bracts in the style of *Cornus canadensis*.

In the Wild Garden several hydrangeas will be flowering. *H. paniculata* is a most desirable late-flowering shrub which has large bunches of sterile white flowers passing to pink in fading; *H. sargentiana*, which prefers the more shady positions, is of completely different appearance, with large dull green hairy leaves and flat, violet, white-margined corymbs. *H. macrophylla* is represented by several forms, and a good collection of these may also be seen on Battleston Hill. The rich blue of the willow gentian (*G. asclepiadea*) will be appearing in many places, with the pink spikes of astilbe and the scarlet *Tropaeolum speciosum* climbing among the azaleas, assisting to form a bright picture. *Lilium superbum* will be at its best in moist places beneath the shade of the oaks, where it will lift its massive head of orange flowers to a height of 10 feet.

Among the few shrubs still flowering in Seven Acres the species of dogwood deserve mention. *Cornus paucinervis* has reddish-brown branches, dark green leaves and large dense cymes of creamy flowers similar to those of *C. alba*, but followed by black instead of white berries. *C. amomum*, purple-stemmed, will soon be ripening slate-blue berries above foliage already taking on bronze tints. *C. kousa* also colours early on this sandy soil, although its beautiful flowers do not as a rule yield the attractive red fruits so freely as bushes in more shaded situations. The brightest part of this area at this time will be the Heath Garden. The varieties of *Erica cinerea*, ranging from purple to the rosy-tipped 'Eden Valley', are conspicuous; the earlier forms of *E. vagans*, such as 'St. Keverne' will be well in flower; *E. terminalis* continues to produce fresh pink clusters, and the indispensable Irish heath (*Daboecia cantabrica*) will still bear many large purple or white blossoms. Among the summer-flowering members of this collection there will be some of the hybrids of the cross-leaved heath (*E. tetralix*), including the Irish *E. mackaii* and *E. praegeri* and the Cornish *E. watsonii* and *E. williamsii*.

In the old herbaceous borders August produces a riot of colour. There is usually a tendency at this time of the year for yellow to predominate, on account of the large number of fine varieties now available in the genera solidago, helianthus, rudbeckia and helenium; but this can be balanced by the free use of the late-flowering salvias, *S. ambigens*, of deep Oxford-blue, and the pale sky-blue *S. uliginosa*; *Eupatorium purpureum* in a dull reddish-purple, and the uncommon *Strobilanthes atropurpureus*, a bushy plant with tubular violet flowers. Effective masses of colour will also be supplied by the scarlet *Lobelia fulgens*, *Lythrum* 'Rose Queen', a richly-hued loosestrife, varieties of the aromatic bergamot (*Monarda didyma*), and *Lavatera cachemirica*, which has tall spikes of rose-coloured flowers.

The visitor is likely to find some interesting plants in the Half-hardy House. *Mandevilla suaveolens*, climbing to the top of the roof, will be laden with fragrant white blossoms, and close by, the leafy stems of

Littonia modesta will be hung in their upper parts with golden bells. *Haemanthus coccineus* will be pushing up thick scapes crowned with dense, scarlet-bracted heads, and even more imposing inflorescences will be developed by *Amarcrinum howardii*, a bi-generic hybrid raised from a cross between the belladonna lily and a crinum. This has bold, evergreen foliage and heads of large, pale pink, lily-like flowers. *Solanum jasminoides*, a rampant climber, flowers all the summer here, and towards autumn the climbing *Calceolaria pavonii*, with leaves unusually large for this genus, opens sulphur-yellow flowers in immense panicles.

Of the ornamental shrubs and climbers which may be expected in the Temperate House, the following will repay inspection: *Orphium frutescens*, a South African member of the gentian family, with erect growths crowned with clusters of rose-pink blooms; *Jasminum azoricum*, a sweetly scented species with dark green leaves, *Pandorea jasminoides*, the bower plant of Australia, high-climbing and producing great bunches of white and pink trumpet-shaped blooms, *Cassia corymbosa*, laden with golden flowers, and *Clerodendron ugandense*, a shrub of lax growth with open panicles of sky-blue flowers.

IRISES FOR EVERY GARDEN

H. J. Randall, C.B.E.

(*Lecture given on June* 4, 1957, SIR FREDERICK STERN, O.B.E., M.C., F.L.S., V.M.H., *in the Chair*)

IT was about ten years ago that the last lecture on irises was given in this hall to members of The Royal Horticultural Society. During the intervening period much progress has been made in the development of dwarf, tall bearded and certain other irises, there is now a wider range of plants available for our gardens, and interest in the flowers is probably greater than ever. There are Iris Societies in Britain, the United States and Canada, Australia, New Zealand and South Africa, and by the exchange of visits, publications and plants a fund of goodwill is being created.

The title of my lecture does not mean that there are irises in existence which will grow normally in every type of garden. Most of the species and hybrids we now have in this country came originally, or were bred, from importations from arid areas in the Middle East, mountainous districts round the Mediterranean, the swamps of Louisiana or other widely different and separated places. If ideal positions are to be given to all these plants we must provide conditions which approximate to their original habitats; and there are no gardens in Britain which are endowed by Nature to be so resourceful. Gardeners are, however, ingenious and often patient people, and they can, by artificial means,

or by taking advantage of certain features in their gardens, provide suitable homes for many of the varied members of the iris family. I therefore claim that there are irises which are suitable for almost every type of garden in this country, and the purpose of my talk is to indicate which are the plants best suited to each type of garden.

In giving names of either species or hybrids I am not suggesting that there are no others equally good or better. To decide which flowers are best is always a matter of personal opinion, and I am not yet infallible. I shall try to avoid recommending plants which are extremely rare or expensive, because it is very frustrating to a gardener to search the country for an unobtainable plant or to find that the purchase of a rarity needs a loan from an unsympathetic bank manager. Because of my preoccupation in other ways I would ask that members do not write to me for advice which can readily be obtained from nurseries specializing in irises. All gardeners who are keen on these flowers should consider joining the British Iris Society which does so much to cater for their needs and interests.

In dealing with different types of gardens mention must first be made of what is literally the highest form of gardening—the window box or roof box—and let me add that if inflation continues unchecked in this country many people will end their gardening careers with nothing but a window box. Even this modest contrivance will provide considerable pleasure and give an abundance of flowers throughout the spring and summer. Irises can be planted in the autumn to bloom in the early months of the following year, and after flowering, the bulbs or plants can be replaced by summer performers. For these boxes the following bulbs can be recommended—*I. histrioides major* (a deep blue), *I. reticulata* (in different shades of blue and purple), *I. danfordiae* (a bright yellow, often shown at Westminster) and *I. regelio-cyclus* hybrids (exotic flowers, recently shown at Chelsea, which will add glory to any window). In addition, small rhizomes of *pumila* or *chamaeiris* hybrids can be planted each autumn and split up after they have flowered the following year.

Now we come to the alpine house, a perfect example of which can be seen at the R.H.S. Gardens at Wisley. In an unheated greenhouse numerous plants are grown in flower pots and pans for flowering during the winter and spring—for example, saxifrages, miniature daffodils, sedums, dwarf conifers and irises. Few people can afford such a large alpine house as the one at Wisley, but intense pleasure can be had from smaller ones, and for these I first suggest three difficult irises for gardeners who have the greenest of fingers and a reasonable amount of fortitude—*I. susiana*, *I. gatesii* and *I. lortetii*. Easier ones to obtain and grow are *I. lacustris*, *I. cristata*, *I. gracilipes* and, of exceptional beauty, some of the very small dwarf hybrids now being raised in America and Britain. These often appear insignificant when growing at ground level in the open garden; but on staging under glass or on a table indoors they can be fully appreciated.

Some houses have conservatories in which there are facilities for growing shrubs or tall plants of various kinds. For such places there are two irises of great merit—*I. wattii*, with stems containing many powder-blue flowers, and *I. japonica* (of which 'Ledger's variety' is the best form), another aristocrat with pale lavender flowers.

The need to economize in garden labour is compelling many of us to create shrubberies, and excellent features they can become. Whilst newly-planted shrubs are growing to fill their allotted spaces various forms of *I. sibirica* and *I. spuria* can be planted, provided that the soil is not too dry. Then the borders of shrubberies can be improved by the planting of species (or their hybrids) from the Western American States. Of these, *I. douglasiana*, *I. innominata* and *I. gormanii* are easily raised from seed and give gaily coloured flowers in many shades.

As my own garden has such sandy soil I am always envious when I see the stream at the base of the rockery at Wisley or the stream and damp peaty places in the Savill Garden at Windsor. There they can grow certain irises which fade away with me. Whilst the tall bearded branch of the family will never succeed in water or water-logged soil there are other kinds which flourish in such conditions. *I. kaempferi* is outstanding amongst these, and it can be obtained in a wide range of colours and with flowers which have diameters from four to ten inches. *I. laevigata* is another beauty, having flowers of a rich violet-blue, and *I. pseudacorus* (var. *bastardii*), taller growing, is a deep yellow. A strain of moisture-loving plants has in recent years been imported from Louisiana where they were taken from swampy districts, grown in gardens and improved by hybridization. The flowers are of many delightful shades and their cultivation might well repay the efforts of adventurous gardeners in Britain; but damp soil and reasonable warmth are essential requirements. *I. spuria*, now obtainable in white, yellow, violet and brown shades, and *I. sibirica*, in white, reddish-mulberry and shades of blue, are two old and popular irises which do well in damp places and also in ordinary garden soil. *I. aurea*, *I. chrysographes*, *I. forrestii*, *I. ochroleuca* and *I. wilsonii* are others which can be grown successfully in semi-shady, moist parts of the garden.

Very different irises are needed for the rockery, but here again the choice is wide. In addition to those already mentioned as suitable for the window box or alpine house, we have the Western American species, *I. douglasiana* and *I. innominata* and their hybrids, all of which prefer lime-free soil. Many of the dwarf or semi-dwarf growing species are suitable for rockeries, typical ones being those in the Juno section—*I. bucharica*, *I. magnifica* and *I. warleyensis*, for example.

The hybridization of dwarf irises has recently been actively pursued in America, and it now has its devotees on our side of the Atlantic. The experts have yet to agree on what constitutes a dwarf iris—whether it is one less than 9 inches in height, or 15 or 18 inches—but whilst they are debating their differences the rest of us can grow and enjoy the results of their labours. From experience I can recommend 'Beauty Spot',

'Black Midget', 'Greenspot', 'Moongleam' and 'Sundrop', but there may be others just as good. All of these are equally attractive when grown on the rockery or in some odd corner of an ordinary garden bed.

Now I must turn to the general type of garden owned by the average member of the R.H.S.—not too dry or damp or shady, subject to frosts in winter and occasional drought in summer. There are many irises which thrive in these gardens, but a warning must be given that heavy clay soil should be lightened in some way for tall bearded varieties, by digging old bricks or rubble well below ground level or by incorporating sand and compost in the soil itself, and that chalky or sandy soil should be enriched by the addition of old leaf mould, manure, compost or other organic matter. With this treatment, and if the right choice of plants be made, irises can be obtained in flower from the late autumn, through the winter and spring, to the following July. The list of plants I am mentioning is far from exhaustive, but it will give an indication of what is available and the interest to be gained.

Nearly every house or garden has a wall facing south, and this is the ideal spot for *I. unguicularis* (*I. stylosa*) which can nowadays be obtained in white and different shades of lavender. Except in very severe weather it will generally flower week after week during the whole winter, and for that reason alone it is invaluable. The irises I have suggested for the rockery and edge of the shrubbery can, of course, be grown in any part of the garden, and in addition there are scores of species which do well with the minimum of care. In these days, when labour-saving is becoming increasingly important, it is good to know of plants which can be left undisturbed for three years or more. People who wish to grow species have several ways of acquiring plants—buying from the nurseries which specialize in them, obtaining pieces of root from obliging friends, or getting seed which the British Iris Society are often able to supply to their members. Visitors to the gardens at Kew, Windsor and Wisley, and also to iris nurseries, have ample opportunity of selecting the species which most appeal to them.

Before dealing with the tall bearded, which are the most popular of all irises, I must mention the "intermediates" which have come from planned crosses between dwarfs and tall bearded varieties. In height, size and flowering period these are between their parents, and they are captivating things to grow. Dutch irises are generally associated with florists' shops but they can easily be grown in ordinary gardens. It must be admitted, however, that they rarely lead to the interest and excitement which comes from growing species and tall bearded varieties. The flowers of *I. foetidissima*, a plant which happens to thrive in full shade, are not worthy of special note, but if they are left uncut they will turn into seed pods which eventually split open and disclose rows of scarlet seeds. If the old flower stems are then cut and the seeds left undisturbed, they will provide excellent decoration in the house throughout the winter.

The requirements of tall bearded irises are simple, but they must be met if satisfaction is to be gained. They need a position which is well drained, they like sun although they will often do equally well in partial shade, they should have reasonably good but not over-manured soil, they should be dug up, divided and replanted every three years, and to give of their best they should have a dressing each spring of a fertilizer which contains superphosphate of lime and bonemeal. If, as sometimes happens, irises which have been grown in the same soil for many years become "sick" and fail to flower properly, they should be transferred to some other part of the garden or the soil in which they have been grown should be replaced—a tedious process!—or given an addition of some fresh soil.

To flower well in any year tall bearded irises need at least a reasonable amount of warm sunshine during the previous summer. If their rhizomes can be "baked" during a heatwave, so much the better. The summer of 1956 was unusually wet and sunless, and that largely accounts for the poor season which some iris growers have had in 1957.

Hybridizers of tall bearded irises in different parts of the world have between them been raising hundreds of thousands of new seedlings each year, and there is no doubt that notable improvements have been made, particularly amongst the brown, pink, blue, red and the so-called "black" varieties. Whilst the bulk of this work has been carried out in U.S.A. some credit must be given to British raisers; and here I wish to say that 'Kanchenjunga', awarded the Towndrow Trophy at this year's show of the British Iris Society, is the finest spike of a white iris I have ever seen in any country. The colours of many of these new irises are brighter than the colours of the older varieties: the substance of the flowers is tougher: the petals are generally broader, they have a ruffling of the edges which was almost unknown a few years ago, and the falls have less striation (or haft markings), a factor that makes for greater refinement in the flowers.

Being more critical for a moment I would say that far too many varieties are nowadays being named and introduced which show little or no improvement over existing ones. Some raisers are addicted to the craze for mere size of flower and height of stem: they detect a virtue in their own seedlings which is often unseen by other people: they are sometimes carried away by a dull or exotic colouring which quickly fades in the sun or is useless in the border: and they pay insufficient attention to such desirable qualities as good form in the flower and good branching. But out of the flood of new varieties there can be picked a number of superb flowers which, when more readily available, will become popular all over the world.

Many of the newer and worthwhile irises can be bought at modest prices and are regularly shown at the R.H.S. fortnightly shows. Yet some nurseries are still advertising and selling varieties, raised thirty or more years ago, that are, by comparison with the newer ones, dull and deserving of destruction. These things are even advertised, with

glowing descriptions, in the *Journal* of the R.H.S. If my lecture achieves no other result I hope that it will assist gardeners to choose the aristocrats of the iris world rather than their very poor relations.

Whilst there can be little doubt about the high quality of the irises to which I refer there can be many opinions as to the very best twenty or twenty-five obtainable at a reasonable price—and can anyone give the meaning of the word "reasonable"? I would mention the following few as being in the highest class and obtainable at a modest price, and which could be the basis of any newly-formed collection. A few of the latest introductions, pearls of great price, could be added when the next reduction in income tax makes us feel more light-hearted.

WHITES. 'New Snow' and, costing a little more, 'Cliffs of Dover'.
YELLOWS. 'Ola Kala', for those who like their yellows "hot", and 'Desert Song', in a much softer shade.
BLUES. 'Jane Phillips' or 'Lady Ilse' in the pale blue class, 'Chivalry', a medium blue, and 'Arabi Pasha', in a darker shade.
REDS. 'Quechee' and 'Carnton' (Fig. 103). Most of the old, dull reds should be discarded or avoided.
BROWN. 'Argus Pheasant.'
BLACKS. 'Black Forest' and, much taller, 'Black Hills'.
PINKS. 'Dreamcastle', a bright orchid pink, and 'Chérie' or one of the many other pale flamingo-pinks with tangerine beards.
VARIOUS. 'Lady Mohr', still the best of the 'William Mohr' hybrids, 'Truly Yours', yellow and white, the most popular iris in America (Fig. 104), 'Starshine' a blend of pastel shades and a wonderful show variety, and 'Staten Island', a fine variegata.

With the above varieties or others of equal merit available, and with a choice from the wide range of species and hybrids in this country, we gardeners should have no difficulty in selecting irises which will worthily fill prominent positions or odd corners in our gardens, and at the same time add to our interest and pleasure.

A WEEK-END GARDEN

Dr. Roger Bevan, F.L.S.

(*Lecture given on April* 2, 1957, SIR FREDERICK STERN, O.B.E., M.C., F.L.S., V.M.H., *in the Chair*)

NOWADAYS many of us are week-end gardeners with little or no paid help during the week, and our gardens both suffer and gain from neglect. My excuse for talking to you on this subject is that my own is perhaps an extreme example of a neglected garden. A general medical practice in central London leaves little spare time, and for the past ten years the week-ends have varied from two days to a few hours snatched

on a Sunday; on occasions the garden has been left to its own devices for as long as a month. There is no gardener, though a septuagenarian has put in an occasional day's weeding during the past few summers, and the grass and hedges are cut once a year, sometimes twice. The garden, then, is deserted during the week, except for a fortnight in the spring and three or four weeks in the late summer when the owner is on holiday, and can get down to work.

In 1946 I was lucky enough to buy Cheyne Mead, a cottage on the side of a small valley in Ashdown Forest, 40 miles from my London house. The valley is on the south side of the Forest ridge, and runs south-west; the cottage lies at an elevation of 300 feet, facing down the valley, with a glimpse of the top of the South Downs in the distance. The garden is of just over an acre, rather a narrow rectangle of ground running steeply down the valley-side to the spinney and stream which form its lower boundary. When I bought it there was no garden; only a tempting slope inhabited by bracken, ling, bramble, birch and rabbits. Soil and situation, I knew, were similar to those obtaining in such famous neighbouring gardens as Borde Hill, Wakehurst and Nymans, and the prospect seemed fair.

Before the war alpine plants had been my main interest, and the sloping ground seemed to invite a rock-garden. Large sandstone blocks were obtained from a quarry three miles away at West Hoathly, and MR. WILL INGWERSEN built them into the slope with his usual skill, importing soil and shingle for some of the raised beds. At the same time MR. WALTER INGWERSEN constructed a peat-garden in a bowl-shaped hollow just above the stream, once used for sun-bathing and now partially shaded by the spinney. Peat was imported from Battle and the whole bowl lined to a minimum depth of about 15 inches. Low walls of peat blocks were built up, strengthened by sandstone in places to retain raised beds. The stability of the peat walls was ensured by the large quantity of bracken roots contained in the blocks, which delayed disintegration for five or six years; unfortunately the bracken, presumed to be dead, proved very much alive, and a good many precious hours during the next two years were spent in nipping off the young croziers as they unfolded. Repeated frustration ended in death, and not a shoot appeared after the second season.

In 1948 the rock-garden was ready for planting, and a fairly wide variety of alpines, bulbs and shrubs was installed. A number of rhododendron species were planted, often in full sun, and a big drift of *Gentiana sino-ornata* just above the spinney. Taller growing shrubs were introduced in one or two places for background and concealment. The peat-garden was largely devoted to dwarf rhododendrons and other ericaceous plants, among them the contents of the late DR. GIUSEPPI'S "billiard-table" peatery.

Against the low walls of the cottage itself shrubs such as camellias, ceanothus, *Rosa* × *anemonoides*, R. 'Mermaid', *Crinodendron*, *Vitis*, *Azara* and mimosa (*Acacia dealbata*) were planted, with *Clematis*

montana rubens and *C. spooneri* to clothe the porches. In front of these the beds were filled with smaller shrubs and daffodils; primroses have since made a successful invasion, which is not opposed.

With limited time and money available it was not possible to lay out the whole garden initially, and additions have been made at intervals since in the shape of four large shrub beds, one of which is largely devoted to old-fashioned roses, and the construction of raised terrace beds in front of the cottage, with a retaining sandstone wall. Local labour was employed for the digging and the turves stacked to rot and create a useful reserve of fibrous loam for top-dressing.

Propagation has always been a difficulty; seed raising in pans was tried, but had to be abandoned owing to drying out in my absence; broadcasting the seed has been more successful, and on the retentive undisturbed surface of soil or peat a good many self-sown seedlings have appeared. Unfortunately the corollary is that only the owner can be trusted to do any weeding. A frame of sand and peat for cuttings has proved worthwhile, although those slow to root have usually succumbed to drought during a long absence. Natural layering of shrubs takes place freely, and has been encouraged.

In a deserted garden wild life is undisturbed, and it soon became obvious that rabbits were going to be a menace. Ancient warrens situated at the bottom of the rough old hedge which forms one boundary of the garden proved impossible to clear, and wire netting sunk 18 inches into the ground and $3\frac{1}{2}$ feet high was successfully circumvented by burrowing or leaping. Many good plants were destroyed, often being dug up in a spirit of devilry and left lying on the surface of the ground uneaten, to perish before they could be replanted. Since the arrival of myxomatosis, this persecution of small plants has ceased; rapture is modified, however, by the appearance of a few young rabbits again this spring. Moles have found particularly comfortable and impregnable quarters under the large rocks, and their peregrinations are a constant source of injury to plants and annoyance to their owner. Sporadic trapping does little to keep numbers down, and a sustained attack with poison is only possible when on holiday. Voles and mice also find the silent garden much to their liking, and burrows are everywhere; crocus corms appear to suffer most and are infallibly located, but the juicy young shoots of other spring bulbs are not disdained. This spring every seed of magnolia and embothrium sown in a nursery-bed was promptly disinterred and eaten with the greatest precision. Recently, more pheasants have been reared in the neighbourhood, and I have put up as many as a dozen from the rock-garden on arriving for the week-end; they are particularly destructive in the peat-garden, whose walls disintegrate in dry weather. The worst visitation, however, was from a herd of 17 young heifers which broke in through a thin part of the hedge from the adjoining field one evening some years ago, and were not discovered until next morning. The ground was soft with rain at the time, and hardly a square foot throughout the garden was left without a hoof-mark

3 inches deep, while much damage was done to plants of all sizes by trampling or eating.

There are compensations, however, in leaving a garden to nature, and the abundance and tameness of the birds is one. Most of the common species nest in the garden and can be observed at close quarters at all times of the year. Parties of goldfinches are always about when the thistles are in seed, and ant-heaps in the rough grass of the hillside often attract green woodpeckers. The jackdaws are less welcome apart from making a rapid clean sweep of food from the bird-table, they insist on nesting in the flues of the cottage, causing showers of sticks to descend on the hearth, and eventually blocking the airway completely. Wire netting over the chimney tops has proved the only way of circumventing them. A pair of starlings usually nest in the weatherboard wall of the cottage, and several families of tits are raised in the same situation every year. Dormice seem to find the peat-garden to their liking. I have found them hibernating there, and watched them climbing high up among the rhododendrons in the summer.

Spring frosts have been a limiting factor in the welfare of many shrubs, especially rhododendrons. The cold air settles in the valley bottom, so that young growth and expanding flower buds suffer severely almost every year. Precocious rhododendrons such as *R. mucronulatum*, ×*praecox* and ×*cilpinense* one expects to suffer, but it is bitter to lose the flowers of such species as *R. williamsianum*, *forrestii* var. *repens*, *charitopes* and *neriiflorum* so regularly, and to mark the damage to new growth which must result in absence of flower the next spring. *Pieris forrestii* has never been undamaged in the lower part of the garden, and *Cercidiphyllum japonicum* is always tipped.

Weeds are inevitably a major problem in a garden so much left to itself. Paths can be dealt with by sodium chlorate applied once or twice a year, and the shrub beds by mulching with leaves and bracken or underplanting with heathers, but the rock-garden is not so easily kept clean. Hand-weeding is the only answer, but lack of time (and sometimes inclination) means that the ephemerals are usually a jump ahead, and seed successfully before they are removed. Dandelions rooting deeply between the rocks are well-nigh impregnable, and the fragile sorrel running rapidly through the acid soil is always extending its domain; nothing short of a thorough liming would deal with it, I believe —a remedy too abhorrent to contemplate. Fortunately as years go by one grows steadily less weed-conscious in such a garden as this, and comes to tolerate a degree of invasion which would once have been shocking.

In assessing results after ten years it must be admitted that many of the smaller and more choice alpines originally planted are no more. Strong growing rock plants such as phlox, hypericums and veronicas have flourished, and are very effective as masses of colour. *Lithospermum prostratum* finds the acid loam much to its liking, and the brilliant blue contrasts well with the creamy yellow of *Cytisus praecox*. Raoulias have

done unusually well, creeping out over the flat surfaces of sandstone, even though bare of soil; the silver *R. australis* is the most striking species, but *R. lutescens* with its microscopic grey-green rosettes and rock-hugging habit appeals more strongly to me. It is at its best when encrusted by hoar-frost or peppered with minute golden flowers in June. *Gentiana sino-ornata* grows very strongly, and a large drift planted at the lower end of the rock-garden has been a striking mass of blue in October and November. *G. macaulayi* and *G.* × *carolii* have also done well, but *G. farreri* is not a success. *G. acaulis* flourishes in the natural loam, especially by a little peat and, more important, flowers profusely, while the willow gentian, *G. asclepiadea*, sows itself freely.

Shrubs have a longer expectation of life than herbaceous alpines under conditions of neglect, and the scale of the rock-garden is large enough to allow some of medium size. I would mention particularly *Berberis* × *stenophylla* var. *corallina compacta*, beautiful for several weeks of April in orange-red bud and yellow flower, *Cotoneaster thymifolia*, a low shrub of graceful cascading habit, with fine glistening dark green leaves and dull red berries, and *Rosa nitida*, 3 feet tall, which gradually spreads by suckering into a thicket and provides splendid autumn colour, with scarlet fruits as well as a decent display of deep pink dog-roses in June. *Potentilla fruticosa* in its many forms is an invaluable and indestructible shrub, and I am particularly fond of the varieties *vilmoriniana*, with silvery foliage and cream-coloured flowers, and *arbuscula*, which covers itself in golden florins from April to November every year; this is surely one of the finest dwarf flowering shrubs.

Daphnes have been a success, particularly *D. cneorum*, of which both the type and the variety *eximia* (Fig. 97) have formed masses up to 4 feet across; their sweet scent pervades the whole rock-garden towards the end of April. *D. collina* (Fig. 96), a dense and rounded bush, has its hey-day three weeks earlier, but always flowers again in the autumn, as does *D.* × *neapolitana*, while *D. retusa*, *tangutica* and the beautiful × *burkwoodii* flower profusely in April and May. *D. odora* var. *aureo-marginata* was defoliated by the severe frosts of 1956, but comes through any ordinary winter unscathed with me, and its fragrance is incomparable.

Among the taller growing shrubs *Embothrium coccineum* var. *lanceolatum* has grown and flowered well; a group of three plants is now about 25 feet high, and the brilliant light scarlet flowers show up well against a background of dark holly. The 'Norquinco' form is equally tall, but has not yet flowered. The dogwoods have been disappointing in their paucity of flower, though both *Cornus kousa* and *C. florida rubra* show beautiful leaf colour throughout the season. *C. nuttallii*, perhaps the most desirable species, has reached 15 feet, but is still flowerless. *Metasequoia glyptostroboides*, the dawn redwood, was planted in full exposure on the edge of the rock-garden; one of the original seedlings, it has grown well and is now 18 feet tall, with a substantial trunk and markedly fastigiate habit; it is beautiful alike in spring with its soft

larch-green young foliage and before dropping its russet leaves in autumn. Other autumn colour comes from *Acer nikoense*, *A. griseum* and the varieties of *A. palmatum*, *Fothergilla*, *Stewartia*, *Photinia* and *Liquidambar*. A form of *Euonymus europaeus*, named 'Red Cascade', was strikingly scarlet last autumn and promises to be a very effective shrub when full grown.

The peat-garden has given much interest and pleasure. Dwarf rhododendrons provide the backbone, and are very much at home, flowering freely and producing self-sown seedlings in the peat walls. Particularly good are *R. fastigiatum* and *R. impeditum* with blue-grey foliage and mauve flowers, the charming white-flowered *R. microleucum* and the deep purple *R. russatum*. Several forms of *R. forrestii* var. *repens* are grown, most of which are shy-flowering, a fault which certainly does not apply to the splendid Bodnant hybrids R. 'Elizabeth' and 'Ethel'. *R. imperator* I have found difficult, but the prostrate creeping *R. radicans* is an easy species of most attractive habit. *R. pumilum* is a delightful shrublet, 4 inches high, with waxy pink bells, and I have a special weakness for the daphne-like members of the Cephalanthum series, such as the aromatic *R. radinum* with pink or white flowers and *R. crebreflorum* with larger pink flowers of a particularly charming shape. The *augustinii* hybrids are extremely free-flowering and have formed large plants which give a mass of colour at the end of April and early May: R. 'Blue Tit' and 'Blue Diamond' are outstanding, and seem to give of their best in full sun, where their habit is more compact and their flowering more unanimous. Last year the Exbury form of *R. yakusimanum* flowered for the first time: it is a remarkably beautiful species, particularly at the moment when the flower buds are changing from rose-pink to the purest white as they open; the compact habit and grey-green rosettes with downy white reverse provide a perfect setting for the flowers, and it is unfortunate that it is apparently self-sterile, so that propagation must proceed slowly by layers. Taller species have been planted at the margin of the peat-garden and scattered through the rock-garden; of these *R. yunnanense* is outstanding in grace of habit and freedom of flower, and the pale pink *R. vaseyi* contrasts well with the Tower Court form of *R. augustinii*. *R. cinnabarinum* var. *roylei* is at its best when the evening sun brings a glow into the hanging waxy flowers, but its distinguished descendant R. 'Lady Chamberlain' needs no subtlety of lighting to enhance her beauty.

Shortias and schizocodons grow well in the pure peat but do not flower very freely, and probably need the addition of some loam. Cassiopes and phyllodoces have also been shy-flowering with the exception of *P. coerulea* and *P. aleutica*, which are vigorous species. The rare *Harrimanella* (*Cassiope*) *stelleriana*, however, is well established, a minute creeping plant with nodding pinkish flowers, demanding protection from bright sunlight. Epigaeas have done well, and the pink *Pyrola incarnata* runs rapidly and flowers quite freely. *Linnaea borealis* has covered a shady bank, spreading far and wide, and hanging down in

a curtain over a 3-foot wall. Petiolaris primulas such as *P. bhutanica* and *P. edgeworthii* were successful for some years planted in the vertical peat faces, but eventually succumbed to the activities of the blackbirds. The exquisite *Primula reidii* surprised me by flowering well for two successive years in a shaded mossy part of the wall, but then departed. Nomocharis have been more permanently established in the peat and *N. pardanthina*, *mairei* and *saluenensis* flower regularly and even seed themselves.

Water draining down the hill comes to the surface in the floor of the peat-gardens, and the path through it always is boggy. *Primula rosea* has been naturalized here and sows itself very freely; originally only a fine named colour-form was planted, with the result that the progeny are unusually dazzling in flower. Other moisture-loving plants such as *Astilbe simplicifolia*, *Trollius pumilus* and the Madeira orchis, *O. foliosa*, have been planted by the path, and *Pinguicula grandiflora* brought from Killarney flowered well this year in a bed of pure sphagnum moss. The peat-garden grows very few weeds, and is no trouble to maintain. Various mosses have appeared on the shady banks and the more vigorous of these have to be checked where they invade small plants; their green cushions enhance the cool effect of this part of the garden, however, and the presence of ferns both wild and introduced, together with the sound of the stream below are appropriate.

I hope that I have not dwelt too much upon the difficulties of this week-end garden; they are inconsiderable compared with the interest and refreshment which it has provided over the years, sharply renewed after each week spent away from it in the very different atmosphere of a great city.

SOME PROBLEMS IN GREENHOUSE HEATING AND VENTILATION

J. R. B. Evison, N.D.Hort.

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GREENHOUSES have been in use in Britain for close on two hundred and fifty years and have been heated by hot water in pipes for about half that period. In view of this it is surprising to find that until recently knowledge of their behaviour and to some extent of the plants' reaction within them is largely empiric. Whilst this may be no embarrassment whilst dealing with an existing range of greenhouses it provides an uncertain foundation for the assessment of the relative values of the various types of greenhouse in differing media now available.

Under the stimulus of commerce, where £33,000,000 is culled annually from glasshouse crops, scientists have made a critical examination of horticultural practice in these spheres. This note describes a practical interpretation of this work in so far as it relates to our particular problem.

The background against which this nursery has been built is pertinent to some of the decisions made; each year some 750,000 plants are raised for the needs of the rapidly growing town of Brighton. These are (in part) for floral display, (in part) permanent collections of ferns, palms, orchids, etc., and (in part) the continuous supply of flowering pot-plants necessary for the civic decorations connected with conferences, etc., which may be required on almost any day of the year; also (in part) trees and shrubs for the treatment of new estates, new schools, fresh parks and the refurnishing of many old ones, all too frequently populated by aucubas, privet and euonymus.

These needs have been met in the past by three nurseries—two adapted from private gardens—which, though capable of functioning. could only do so by the use of an extravagance of labour and materials. Nine stokeholds to 20,000 square feet of glass is perhaps indicative of the situation.

Any new scheme had therefore to aim at a material reduction in labour and maintenance costs. This would appear to have been done in that on a loan of £40,000 over 20 years the saving in labour, etc., each year is sufficient to pay off both capital and interest payments.

ESSENTIAL FEATURES

First, less than half the total expenditure was devoted to the glasshouses themselves; the remainder covered roads and the general development of 32 acres of land, reasonably level for the South Downs, for trees, shrubs and hardy bedding plants, such as the wallflowers. Here, one of the greatest labour savers has proved to be a tractor-pulled planter capable of dealing with 4,000–5,000 wallflowers per hour and reducing the task of putting in 400,000 seedlings from weeks to days.

Secondly, choice of the right greenhouse seemed of paramount importance. Tenders were received for all the usual media—teak, deal, Western Red Cedar, Niangon and similar tropical woods, concrete and aluminium. I freely acknowledge embarking on the project with a massive prejudice against metal. As I eventually chose this material it will perhaps be appreciated that I found the evidence overwhelmingly in its favour in the particular circumstances prevailing at Brighton. I do not propose to elaborate on this as the facts are generally available, save to say that the prime factors were the saving in maintenance costs, which over a reasonable period of years offset any extra cost several times, and the favourable behaviour of plants within those examples I inspected during an appraisal of many establishments.

This decision was fortified by the introduction of an aluminium greenhouse designed around a standard piece of Dutch light glass, 56 inches × 28 inches; its obvious advantages in the admission of light, the lack of purlin post obstructions, the ingenious glazing allowing for metallic expansion and contraction, supersonic shocks and careless workmen.

Further examples of the intelligent and original thinking of the

designer, MR. VINCENT HARTLEY, lie in the method of dealing with condensate by a channel in the glazing bar below each pane of glass, which discharges this water by means of a small drainage hole on the outside of the pane next below and so to the gutters. Save in extremes of temperature we have yet to see condensation on any metal part of the houses.

All metal parts of the houses have been stove-enamelled. This guards against oxidation which, whilst not likely to affect structural stability, does offer a roughened powdery surface on which dust, algae, fungus spores, etc., can find harbourage. It also makes possible the use of those fungicides and insecticides which might cause discolouration or deterioration of the metal.

Thirdly, having decided on greenhouse type the twin problems of ventilation and heating present themselves. The control of atmospheric conditions in greenhouses is a subject which has had all too little scientific investigation, despite the fact that it presents problems not encountered in any other type of structure.

The amount of solar radiation transmitted by a horizontal single sheet of glass in these latitudes in midsummer is in the region of 275 B.Th.U. per hour per square foot. This may result in large differences in temperature between the inside of a greenhouse and the outside air. This is caused by the trapping of the sun's rays in the house. Outside the earth absorbs this energy and transforms it into heat and is consequently warmed; then by convection and radiation of longer wavelengths it releases the heat. Consequently, the air is warmed but, not being confined, it is dispersed through the volume of the atmosphere.

In the greenhouse, the short wavelengths emitted by the sun pass through the glass, 97 per cent being delivered through it. This then strikes the opaque objects within the house—benches, plants, soil, etc., and is absorbed by them. Such objects transform this energy into heat and pass it back to the air by convection and by radiations of a much longer wavelength. Much heat is retained in the house as these long wavelengths do not pass through the glass which may absorb 90–95 per cent of the energy. This transforms into heat much of which is given back to the interior of the greenhouse by re-radiation and convection.

Ventilation is the problem of reducing this induced high temperature when it rises above that considered good for the plants contained in the house. Supply of carbon dioxide is probably a subsidiary problem which is largely solved by the air changes which take place through imperfections in glazing, the opening of doors, etc. This requirement is in the order of two air changes per hour in midwinter, generally the only season when houses are likely to be closed for any length of time.

Air changes on a hot summer day may be as high as 100–120 per hour in a really well ventilated greenhouse. Very few houses are so efficient; many—to the detriment of the plants within—are as low as 30–40 per hour. In such houses the temperature may rise to 110° F.

and over on a hot summer day (say, 78° F. outside shade temp.); a well-ventilated house might be 92–94° F.

Normal ventilators at the ridge and sides seem to give a reasonable distribution of fresh air and, consequently, of temperature up to about 18–20 feet of house width. Above this, curious air patterns arise. The most interesting point is perhaps the fact that cool air coming in at the side ventilators does not necessarily make its way to the middle of the house before warming up to rise to the top vents and so to open air again. A considerable proportion of air entering a large greenhouse appears to circulate near the point of entry until warm; it then takes the shortest route, i.e. near the glass, to the top vents. Such short circuits are little help in the cooling of the main air mass of the house.

With this in mind it was decided to use a system of forced ventilation on the larger houses, i.e. 27 feet wide. This was made especially necessary by the fact that one level ventilation, as normal in houses of this type, whilst giving excellent results up to 21 feet, was markedly not so good above this width. Further, as these large houses were to be used for bedding plants in which a very low temperature to assist in hardening off before planting is most desirable, good ventilation was essential.

The makers gave much thought to this problem and have produced as illustrated (Fig. 100) what seems to be the most satisfactory fan ventilation system produced to date. Even so, it is not so efficient as natural ventilation in smaller houses as its maximum efficiency is about 60 air changes per hour. The fans are placed in the four corners of the houses; they depend for their efficiency on the correct placement of air intake louvres which open and close automatically with the switching on and off of the fans by their thermostat. Air movement is gentle and not perceptible except in the immediate vicinity of the intake and outlet points.

It has been of interest to note the complete absence of leaf scorch in these houses. Normally sensitive plants such as hydrangea and begonia have been sprayed with water in full sun without ill effects. It would appear that the air movement is sufficient to keep leaf and petal temperatures cool enough to prevent damage. Phenomenally high sets of late planted tomatoes have also been recorded.

The problem of shading to assist in lowering temperature remains to be solved. The following have all been tried but discarded for the reasons bracketed: the use of blinds (cost); running water (cost and mechanical troubles); coloured glass (poor growth). Limewashing is being used in spite of the difficulty in application and removal, and unsuitability to intermittent requirements.

So we arrive at the problem of *heating*. The construction of these houses was contemporaneous with interest in space heating. This involves the placement of a heater in the greenhouse. Heaters usually contain a unit to produce a flame based on pressurized air and oil. The products of this combustion are passed out of the house by way of a heat

exchanger. This is frequently a series of tubes heated from within by the passage of the escaping gases. Air from the greenhouse is drawn in by means of a small fan and passed over the outside of these tubes, being warmed in the process. A temperature rise of 60–70° F. in the air passed through is usual.

The warmed air is discharged through louvres at the top of the heater. In our experience this gives a most satisfactory distribution of heat in any horizontal plane, i.e., if at any point 2 feet from the ground the temperature be, say 50° F., then at any other point in the house, also 2 feet from the ground, it will be ± 2° of this figure. Very few heating systems indeed can equal this. In a vertical plane the picture is less satisfactory and may rise by 1° per foot of height. This accumulation of heat in the roof may mean an unwelcome loss of heat in cold weather. Against this we can say that with an outside temperature of 12° F. we were able to maintain 43° F. in the house at a cost of about 2*s.* per hour for a floor space of over 4,000 sq. feet. Extra attention to damping down is necessary to compensate for some drying of the air in heating.

The capital costs of such an installation comparing favourably with pipe heating, it was decided to use these heaters in the largest houses (127 feet × 27 feet), to be used for bedding plants where the heat requirement was short (February–May) and low (45–50° F.).

Quite a different set of circumstances ruled in the remainder of the houses. Propagating houses with frames allowing for bottom heat; heated frames; the heating of ancillary buildings and the heating of divided houses all posed problems to which space heaters had no immediate answer.

An examination was therefore made of the available methods of heating. These were:

(*a*) 4-*inch hot water system, gravity circulated.* This was discarded as: (1) temperature control was far from good; (2) wasteful of fuel and labour; (3) pipework of this size is cumbersome and frequently obstructs labour or does not supply heat where required; (4) the necessity of sinking the boiler house below ground is costly and inconvenient; (5) the above seem to outweigh its obvious good points, i.e. simplicity and freedom from devices which might fail, etc.

(*b*) *Low pressure steam.* By this system, usually operated in 1¼-inch pipes, steam at about 5 lb. per sq. inch in the pipes gives a temperature in those pipes of 227° F. The steam gives up its latent heat to the pipes and the condensed water resulting is drained off at the far end of the system, through steam traps, to be returned to the boiler. This method was rejected as there were difficulties in obtaining even temperature and a pipe temperature of 227° F. or nothing seems to indicate a lack of flexibility which, if avoidable, is best not incurred.

(*c*) *Pressurized hot water in small pipes.* Rejected owing to problems of insurance and the faults of steam.

(*d*) *Steam injection into water.* Has many attractive features on

large existing 4-inch systems but owing to the noise and vibration, seemingly inseparable to this process, and certain difficulties when small amounts of heat are required it was passed over.

(*e*) *Hot water in small diameter pipes* (1½–2 *inches*) *rapidly circulated.* Our choice fell upon this last system as it appeared that good control could be obtained; that there was economy in capital cost and little difficulty in fitting pipes where they were wanted without undue structural difficulties.

Basically, heat is supplied by two 1¾ million B.Th.U. sectional boilers, fired by oil burners and using 200 sec. medium fuel oil. This heat is distributed by a 6-inch main which runs across the length of and under the centre of each greenhouse.

Pipes of 1½ or 2 inches diam. supply heat in the houses; the effect of this centrally placed main is that each loop is half as long as if the main were at the end of the greenhouse. Thus it is easier to maintain an even temperature along its length. Circulating pumps ensure that the heated water returns to the boiler in about 10 minutes, the drop in circuit being in the order of 10–15° F. Raising to its original temperature is thus economical. This is achieved by a water temperature of 180° F. Obviously there are many occasions when this will not be required. Accordingly, a potentiometer, or compensator, is fitted externally which reacts to variations in the atmosphere—sun, wind, fluctuations in temperature, etc., in the same way as a glasshouse. It controls the temperature of the water in the flow by its reactions. Thus a clouding over of the sky at night and a rise in temperature effects a lowering of the heat of the flow and prevents a waste of fuel. Equally, a drop in temperature is allowed for and a change of conditions should not produce an unpleasant surprise in the morning.

Fourthly, watering has had quite a lot of attention. Between the private gardener's watering can, with its selection of roses, and the commercial grower's hosepipe a great gulf exists.

As experiments at John Innes Horticultural Institute indicated that there appeared to be no foundation to the oft-repeated assertion that water used in greenhouses should be at the houses' temperature and fortified by the fact that mains water temperature here is around 50° F. even in the coldest weather, threaded taps have been installed instead of tanks; to these ⅜-inch hose-pipe, which handles very easily, is fitted. The business end is controlled by a spray lance with instantaneous cut-off grip control. In effect, the operator has a never-emptying watering can over which he has the same control, or better, than with his traditional can (Fig. 101).

Older gardeners find it very difficult to accept either the scientific evidence or the commercial growers' experience in this respect. One can only say that two years' experience has given no reason to regret its installation, whilst the saving in labour and time has been remarkable. Another point in its favour is the removal of a fertile source of disease—the water tank.

THE CURE OF CHRYSANTHEMUMS FROM SOME VIRUS DISEASES BY HEAT

M. Hollings and B. Kassanis†*

VIRUS diseases are the main cause of degeneration of chrysanthemum stocks in this country, and at least ten different viruses are involved (HOLLINGS, 1955). Some of the ten cause severe effects in leaves or flowers of many varieties; some produce no obvious symptoms in most varieties, but severely damage a few. Many varieties of chrysanthemum are badly infected by one or more of these viruses, and of some varieties it has proved impossible to find a single virus-free plant. We describe below our attempts to free some chrysanthemum varieties from infection with seven different viruses.

DESCRIPTION OF THE METHOD

Hot-water treatment of chrysanthemum stools for eelworm control is less common today than formerly, as organo-phosphorus insecticides have proved more convenient. As the old hot-water treatments might have exerted some control of virus diseases, we tested the method to see whether it would cure infected stools. Plants of the varieties 'Shirley Late Red' (infected with aspermy virus and virus B), 'Pink Valet' (infected with vein mottle virus and virus D), 'Roseverne' (infected with stunt and ring pattern viruses), and 'Red Majestic' (infected with virus E) were treated at 115° F. for 5 minutes, or 109° F. for 25 minutes. Cuttings from these stools were then tested for virus infection, and allowed to flower. No plant was freed from any of the viruses; nor were the flowers on treated plants different from those on untreated plants.

A hot-water treatment is of necessity brief, and experience with other virus-infected plants has shown that longer periods at air temperatures of about 97° F. are more effective in eliminating viruses (KASSANIS, 1956). Plants will survive long exposures to high air temperatures provided the growing conditions are good, and they are given ample light. To provide such conditions an incubator was designed (KASSANIS, 1954) in the shape of a miniature glasshouse, 2½ feet wide, 3½ feet long and 3 feet high at the ridge. The plants stand in pots on a slatted wooden floor, raised 5 inches from the bottom. The heat is provided by four steel-jacketed heater units, each 230 watts, which are mounted on metal feet an inch from the bottom of the incubator. Two asbestos baffle boards, 4 inches apart, separate the heater from the slatted floor. Ventilation is provided by a row of seven 1-inch holes on each side, opening to the outside from the space containing the heaters, and by a similar row of holes along the central ridge of the roof. A 6-inch fan, mounted vertically and driven by a ½-h.p. electric motor at about 900 r.p.m., keeps an even temperature throughout the incubator. The

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heaters are thermostatically controlled at 97° F. ± 2° F. The incubator can accommodate twelve plants in 6-inch pots, standing in saucers containing water. The water in the saucers is replenished from a container kept in the incubator, so that the water is also at 97° F. Chrysanthemum plants can be treated only in summer and even then some usually die. Losses are decreased by using well-rooted, vigorous plants, and by acclimatizing plants by stages to the ultimate temperature of the treatment.

Previous experience with other viruses indicated that the plants should be kept between three and four weeks at 97° F. Immediately after the treatment, small cuttings are taken from the treated plants, because virus sometimes survives in parts of the rootstock and will later multiply and reinvade the whole plant, whereas most of the cuttings give rise to healthy plants. It is advisable to pinch off the growing tips of the chrysanthemums two to three weeks before treatment, so that lateral shoots are formed to provide such cuttings.

CONDITION OF THE PLANTS BEFORE THE TREATMENT

The varieties used, the viruses known to be present, and the symptoms produced, are listed below.

'Market Gold': infected with aspermy and vein mottle viruses. Symptoms: flowers small and distorted (caused by aspermy virus), and slight leaf mottle (vein mottle virus).

'Pearl Sweetheart': infected with aspermy and vein mottle viruses. Symptoms: severe flower distortion and colour breaking (aspermy virus), also slight leaf mottle (vein mottle virus).

'Pink Valet': infected with virus D and vein mottle virus. Symptoms: severe flower distortion, bleaching and colour breaking (virus D), also slight leaf chlorosis and veinal mottle (vein mottle virus).

'Purple Prince': infected with aspermy, vein mottle, and an unidentified virus. Symptoms: severe flower distortion, floret twisting and colour breaking (aspermy and the unidentified virus), and slight leaf mottle (vein mottle virus).

'Roseverne': infected with virus B. No symptoms.

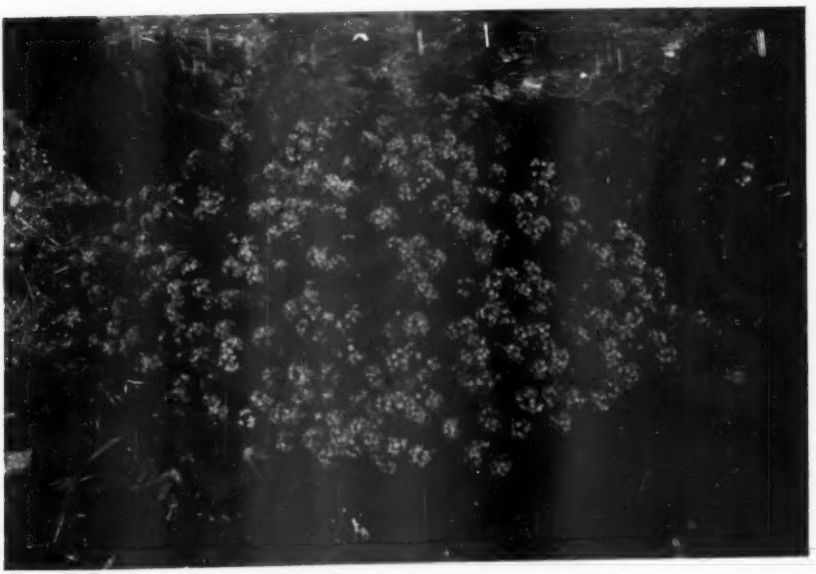
'Roseverne': infected with stunt and ring pattern viruses. Symptoms: flowers small, bleached and distorted (stunt virus), and ring and line patterns on the leaves in winter and spring (ring pattern virus).

RESULTS OF TREATMENTS

Groups of four plants each of the variety 'Pearl Sweetheart' were heat treated for two, three, and four weeks respectively. Each plant was then tested for aspermy virus by inoculation to tobacco plants. Cuttings taken from the chrysanthemums were tested on several occasions, and grown on for flowering. Two of the original chrysanthemum plants (treated for two weeks) proved to be infected when tested after ten weeks, though apparently virus-free when tested immediately after treatment. This illustrates the necessity for taking cuttings, because out of

A WEEK-END GARDEN

FIG. 96—*Daphne collina* (See p. 331)



Photos, R. Bevan

FIG. 97—*Daphne cneorum eximia* (See p. 331)

Photo, J. E. Downward

A WEEK-END GARDEN

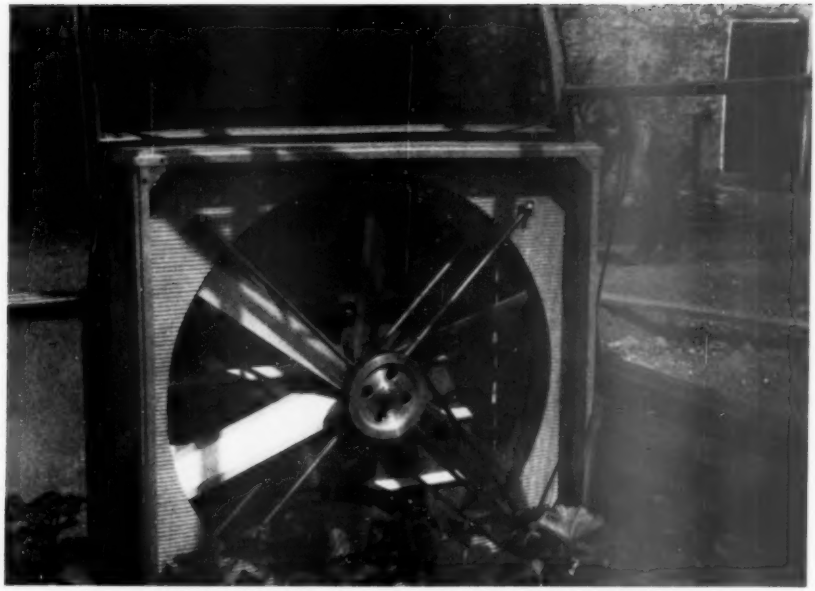
FIG. 98—The rock garden at Cheyne Mead

FIG. 98—The rock garden at Cheyne Mead

Photo, J. E. Downward

A WEEK-END GARDEN

FIG. 99—Early-flowering rhododendrons in the rock garden at Cheyne Mead in April



GREENHOUSE HEATING AND VENTILATION

FIG. 100—A 36-inch ventilation fan capable of extracting 6–7,000 cubic feet per minute without causing a draught (See p. 336)

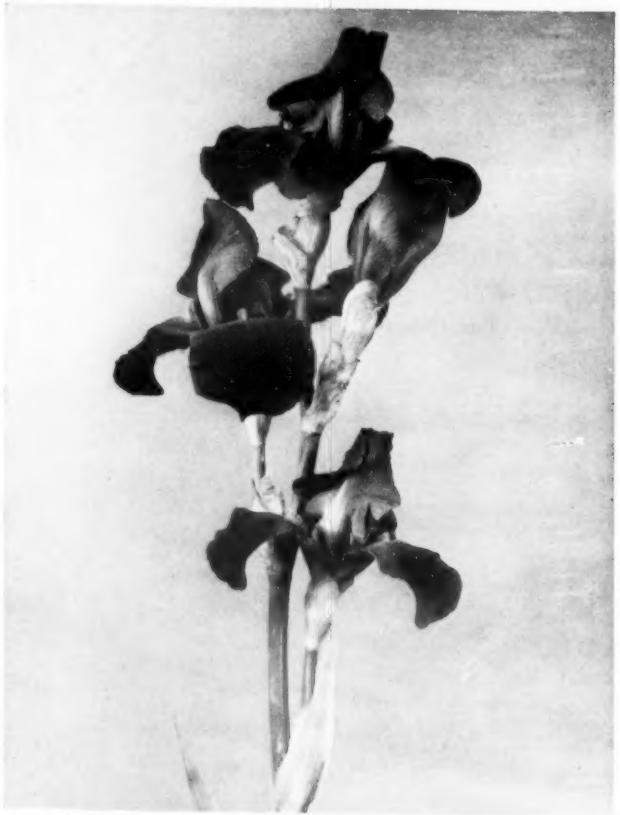
Photo, Hamilton Studios, Brighton

FIG. 101—Watering unit showing automatic cut-off of $\frac{3}{8}$-inch hose piping (See p. 338)

Photo, J. E. Downward

IRISES FOR EVERY GARDEN

FIG. 102—Iris 'Sarah Elizabeth'. A pale blue variety with fine form and pure colouring



Photos, J. E. Downward

IRISES FOR EVERY GARDEN

FIG. 103—Iris 'Carnton' (See p. 327)

FIG. 104—Iris 'Truly Yours' (See p. 327)

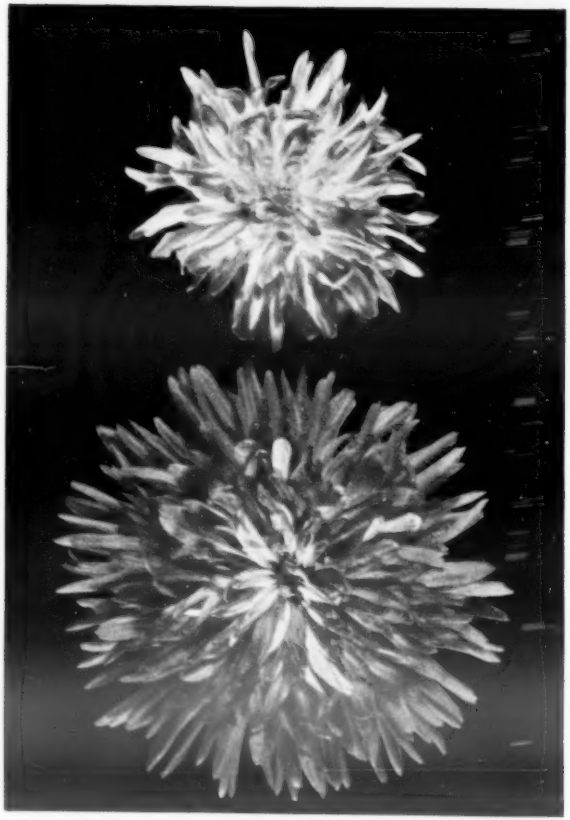
FIG. 103—Iris 'Carnton' (See p. 327)

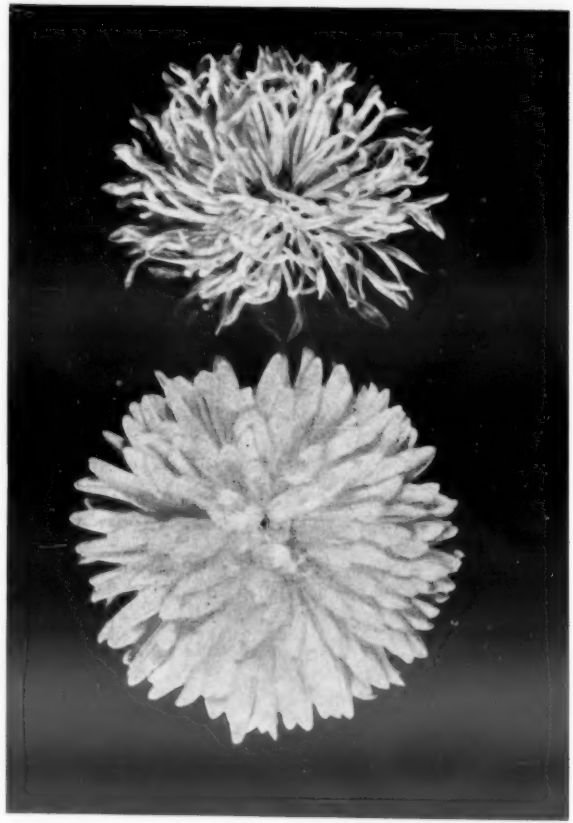
FIG. 104—Iris 'Truly Yours' (See p. 327)

CRINUM FLACCIDUM

FIG. 105—Excavating mature bulb near the Clayton river. The original soil level is indicated. Note severed roots to left of root system (See p. 346)

FIG. 106—Mature flowering plant 2 feet high with seven flowers fully out and numerous buds yet to open. The flowers are 2½–3 inches in diameter and cream in colour (See p. 347)





HEAT THERAPY OF CHRYSANTHEMUMS

FIG. 107—Chrysanthemum 'Roseverne'. *Top:* Flower showing symptoms of Stunt. *Bottom:* Heat treated, free from Stunt (See p. 341)

FIG. 108—Chrysanthemum 'Market Gold'. *Top:* Flower showing symptoms of Aspermy. *Bottom:* Heat treated, free from Aspermy (See p. 341)

forty-three cuttings taken at the end of the treatments, only three were infected. All treated plants and cuttings were tested for vein mottle virus by grafting to the variety 'Mistletoe'; all were still infected. Flowers produced the following autumn had no colour breaking or distortion, and were in all respects better than flowers from untreated plants. Vein mottle virus, it should be mentioned, does not normally affect the flowers.

All other varieties were heat treated for four weeks, and at least two plants were used for each. Cuttings were then taken from these plants, and tested for the appropriate viruses. All cuttings from the varieties 'Market Gold' and 'Purple Prince' were free from aspermy virus, but still contained vein mottle virus. The flowers on cuttings of 'Market Gold' appeared perfectly normal (Fig. 108), in contrast to flowers on untreated cuttings. Treated cuttings of variety 'Purple Prince' bore better flowers than did untreated ones; they did not show the colour breaking characteristic of aspermy virus, and the flowers were less distorted, but floret twisting caused by an unidentified virus still remained.

Cuttings of treated plants of variety 'Roseverne' showed no ring pattern symptoms, and tests by grafting to healthy plants of this variety confirmed that all cuttings were free from this virus. Grafts from these cuttings to variety 'Mistletoe' showed that all the cuttings had been freed from the stunt virus. The flowers were greatly improved (Fig. 107) and of good quality.

Cuttings from heat-treated plants of variety 'Roseverne' infected with virus B, were tested by inoculation to petunias in the winter months; all were still infected.

Cuttings from the variety 'Pink Valet' when tested after treatment proved to be still infected with virus D and vein mottle virus; the flowers showed the same severe symptoms as did untreated plants.

FIG. 108—Chrysanthemum 'Market Gold'. *Top:* Flower showing symptoms of Aspermy. *Bottom:* Heat treated, free from Aspermy (See p. 341)

FIG. 107—Chrysanthemum 'Roseverne'. *Top:* Flower showing symptoms of Stunt. *Bottom:* Heat treated, free from Stunt (See p. 341)

PRACTICAL APPLICATION

Our experiments have shown that by heat treatment chrysanthemum plants can be freed from infection with aspermy, stunt, and ring pattern viruses, but not from viruses B, D, vein mottle, and an unidentified virus. Using the same method HITCHBORN (1956) has cured the chrysanthemum variety 'Red Invader' from infection with cucumber mosaic virus. Although heat treatment is effective against only half of the viruses so far treated, the practical value is great because it eliminates some of the most destructive viruses. Even when only one of the viruses can be inactivated in a plant infected with two or more viruses, the quality of the bloom is often much improved.

The use of this method would not be to "cure" the entire stock of any affected variety, but to provide a nucleus of a few plants from which larger stocks might be propagated. Plants freed from any virus are susceptible to reinfection with that or with any of the chrysanthemum viruses, and to maintain their health it would be essential to multiply them away from other chrysanthemums, and in insect-free surroundings.

It is essential to avoid infection of the treated plants in the initial stages of "bulking up".

It should be stressed that heat treatment does not automatically result in cure; plants are individual things, and even within a clone some treated plants may be cured, while others remain infected. Thorough testing is therefore necessary after treatment, before plants are selected as suitable for bulk propagation.

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CHOOSE APPROVED SPRAY MATERIALS

W. C. Moore

THE appearance early next month of a further list of proprietary spray materials officially approved by the Ministry of Agriculture, Fisheries and Food* provides an opportunity of drawing attention to a scheme which is not as widely known to gardeners and nurserymen as it deserves to be.

The scheme is called the Crop Protection Products Approval Scheme and it began in 1942 following an agreement reached between the Ministry and the Association of British Insecticide Manufacturers. It was devised to help growers choose good materials when they wish to spray their crops to control pests and diseases, or when they wish to kill weeds: and an approved product is one which, when properly used according to the directions on the label, can be relied on to meet the claims made for it on the tin or package. This Approval Scheme, as it is familiarly called, is concerned solely with the efficiency of a product in controlling the pests and diseases named on the label, or in killing certain weeds. The safety of the product to man, beast and bird is guarded against by other means, but no new product can be approved or appear in the Approved List until its safety in use has been considered by Government departments and any necessary precautions announced.

The Approval Scheme is a purely voluntary one. There is nothing to prevent manufacturers from selling unapproved products or to compel them to seek official approval. Consequently, if a grower is anxious to buy approved products he must be able to satisfy himself that they are approved, and he can do this by looking at the tin or package for the diamond-shaped approval mark reproduced in Text fig. 1. So much information is given on the labels nowadays that there is often little room for the mark, and sometimes it may be rather inconspicuous, especially on small packs, but if the product is an approved one it will be present somewhere. There is, of course, no reason to assume that if the mark is

* Crop Protection Products Approval Scheme. Approved List 1957.

not present the material will not be effective: indeed, some of the newest materials will not carry the mark, however good they may be, because they do not normally become eligible for approval until they have been on the market a couple of seasons, and have proved their value.

Why, then, is it in the interests of growers to use only the approved products whenever possible? One of the answers to this lies in the method of approval. The scheme is run by two bodies—a Joint Panel and an Advisory Committee. The Joint Panel is concerned with principles and general guidance. It comprises the Advisory Committee, and

GROUP
NO.
MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
DEPARTMENT OF AGRICULTURE FOR SCOTLAND
This product is guaranteed by
to conform to a standard approved by the Ministry and the Department for preparations to be used for the purposes given on this container and is included in the approved list under the
CROP PROTECTION PRODUCTS APPROVAL SCHEME

TEXT FIG. 1.

representatives of the Association of British Insecticide Manufacturers, the National Farmers' Union, the Agricultural Research Council and the Government Chemist's Department. The Advisory Committee is the body that considers individual applications and recommends approval, and its work is strictly confidential. It consists at present of ten eminent scientists, drawn from agricultural research stations, universities and government departments, and each one of them is a specialist in one branch or other of the science of crop protection. The secretariat is provided by the Plant Pathology Laboratory at Harpenden.

Before manufacturers can obtain approval for their products they must disclose certain particulars about the composition of the products to the Advisory Committee and must, among other things, either

guarantee that they conform to an official specification, or provide evidence from field trials that they effectively control the pests and diseases for which claims will be made on the labels. Copies of the labels to be used on the tins or packages containing the product are carefully scrutinized, and each claim and method of application has to be approved. Moreover, no subsequent alteration in the composition of the product or in the wording of the label is permitted without the prior approval of the Committee. No control is exercised over the content of general literature issued by the manufacturer, but reputable firms can be expected to ensure that this conforms in general with the claims made on approved labels.

This brief account of the basis on which approval is granted will perhaps suffice to show that if a grower insists on having products bearing the approval mark—as he should do if they are available—he is able to rely not only on the reputations of the manufacturer and of his supplier but also on the carefully considered opinion of a body of scientists well qualified to judge. To choose the right product for a particular purpose he must refer to the approved list, copies of which can be obtained free on application to the Ministry of Agriculture, Fisheries and Food (Publications), Soho Square, London, W.1. When the first list was issued in 1944 it was little more than a catalogue of some sixty proprietary products. Since then many improvements have been made and the 1957 List contains the names of over 400 approved products, and includes a comprehensive index which enables the user quickly to find the appropriate product for the particular crop, weed, pest or disease involved. Hints are also given on ways of avoiding the dangers of spray drift, on safety precautions, on sensitive varieties and other topics. Under each group of chemicals listed several proprietary products will usually be found, and no attempt is made to place these in order of merit. The final selection must rest with the purchaser, but it can be made in the knowledge that whichever is chosen it will be effective if used properly. As a special help to the amateur an asterisk has been put against the products which can be obtained in small packs from retail shops.

CRINUM FLACCIDUM (MURRAY OR DARLING LILY)

T. R. N. Lothian, N.D.H. (N.Z.), F.R.H.S.
(*Director of Botanic Garden, Adelaide, South Australia*)

IT is strange that while very keen interest has been taken in most *Crinum* species, especially those found in the Americas, little or no attempt has been made to cultivate the Australian species. In recent years the Amaryllis Society of America has taken an interest, and some preliminary hybrids have been made between Australian and other species. However, it is unfortunate that the Australian species,

especially those referred to hereunder, have not been widely cultivated, because they are very worthwhile garden plants.

In *Curtis's Botanical Magazine*, t. 2133 (1820), *C. flaccidum* is first described and illustrated. In this journal the common name is "Macquarie Crinum". The collecting notes state: "The *Crinum flaccidum* is a native of New Holland and was discovered on the same expedition that produced the Purple and Yellow Callostemmas before published 'under the Macquarie Range in East longitude about 146 and about 30 South latitude'." This point is well west of the main Dividing Range in southern New South Wales close to the district of Gooda.

The plate depicts a broad-petalled very pale cream form which usually is the "inland" form as distinct from the white one found along the banks of the Murray and Darling Rivers and their tributaries. The former form is generally regarded as *C. flaccidum*. The narrow-petalled white form found along the river bank is often called *C. pedunculatum*. Today there is some botanic doubt regarding the separate identity of these plants. Previously, while the former was distinguished by its few flowers per umbel (six to eight) and leaves up to 2 feet long, *C. pedunculatum* was identified by the larger number of flowers (up to twenty-five) and longer (3–4 feet), broader (2–4 inches) and glaucous leaves. The flowers in each form are fragrant. It is likely that *C. pedunculatum* with further investigation may be limited to banks and regions of regular water supply, whilst *C. flaccidum* has a distribution covering hundreds of square miles in the drier and arid parts of inland Australia.

The *R.H.S. Dictionary* gives the habitat for the genus: "Native of the warmer parts of the world, especially in the coasts and occasionally on streams or on marshes. Much more rarely far inland."

The distribution of *C. flaccidum* within Australia is very widespread. Excluding the eastern coastlands and following this around to Adelaide, it is unlikely to be found nearer to the sea than 200–250 miles. It is not found in Tasmania. The notable exception is along the Murray River lagoons and billabongs. Northwards its distribution covers isolated localities, e.g. it is found in great abundance and colours at the Andamooka opal fields (about 300 miles north-north-east of Adelaide and on the eastern side of Lake Torrens). This region receives less than 6 inches of rain per year and is well away from any river course in the generally accepted sense of the word. There are rivers and they are marked on maps, but they flow only when rain falls and may remain dry for years at a stretch.

Under such an environment the *Crinum* in particular must adapt itself for survival. While the surface soils may be sandy and light, at depths up to 3 feet a hard impervious clay layer will be found. This is the survival layer and all perennial and persistent plants, whether bulbs, shrubs or trees, must get their roots into this layer to withstand the long and frequent droughts.

It has long been considered that the cultivation of *Crinum flaccidum*

in Australia, and Southern Australia in particular, has not been in keeping with its natural habitat. There has been a tendency within Australia to follow somewhat blindly the well tried and proved gardening practices of the great English and Scottish gardeners of the past century. While sound for the environment for which they were developed, these produce rather ludicrous effects. Thus it will be found in the case of *Crinum* that the general dictum to plant the neck of the bulb at or just below ground level is likely to lead to severe scorching under our conditions, and especially under Adelaide conditions.

In September last year on a botanical and plant collecting expedition to the northern parts of South Australia, a survey was made of the local growing habits of *C. flaccidum* on the Clayton River (approximately 400 miles north of Adelaide). This river flows westward from the Lake Eyre basin into the Lake, and in seasons of torrential rains carries large volumes of water. The region itself rarely receives more than 4–5 inches of rain annually. Evaporation rates in excess of 100 inches per year are common. Along the banks of the Clayton River evidence of large numbers of *C. flaccidum* could be seen in the almost dead widespread rosettes of straplike leaves. After searching, some plants still in leaf were found. Associated plants included River Red Gums (*Eucalyptus camaldulensis*), which line the sandy banks, Umbrella Bush (*Acacia ligulata*), Cassias, Cane Grass (*Zygochloa paradoxa*), *Ptilotus obovatus*, *Typha* sp., Nardoo (*Marsilea* sp.), *Dodonaea* sp., *Wahlenbergia* sp., *Senecio magnificus*, *Swainsona* sp., *Nicotiana* and *Sonchus*, were noted.

The accompanying photograph (Fig. 105) shows the original soil level and depth of excavation necessary to remove the entire bulb. From ground level to the bottom of the bulb is 23½ inches. The bulb of a mature plant weighed approximately 6 lb., and measured 6 inches long and 4 inches in diameter. The neck, which appears to be permanent and through which the new leaves appear each year, is approximately 18 inches long. Alongside the mature bulb an immature bulb was located. This was probably four to six years old and at that stage was 9 inches deep to its base. This is also shown in the photograph, together with a few seeds for comparison of size.

The flowering of these bulbs in these regions depends largely on the presence of abundant water, and plants in this area had flowered during June and July.

The seed, which in some instances is four to six times the size of *Brunsvigia*, is usually produced in abundance following a good season. Two or three and sometimes several smaller seeds are found in an individual capsule. The seeds measure up to ¾-inch in diameter, roughly globular in shape and weigh up to one-third of an ounce each. The capsules split open, releasing the seeds, or the flower stem is bent over by the weight of the seeds and they fall to the ground, usually in groups. Almost immediately, a long fleshy pro-root is produced and proceeds to penetrate the ground to stabilize the seed. This develops into the young bulb, drawing nourishment from the seed until the

primary leaf is produced. Then follows a developmental period during which not only does the size of the bulb increase, but also the long and contractile roots gradually pull down the bulb from the surface layers of the soil until finally the bulb is sitting on the impervious clay layer at least 15–24 inches below ground level.

While the removal of the bulb is a somewhat strenuous business (that photographed took nearly 45 minutes), to excavate fully the root system would be practically impossible. The roots, about the thickness of a lead pencil, grow horizontally from the base of the bulb in all directions. Their spread is tremendous and in some instances probably exceeds 10–12 feet.

Contrasting with the deeply set bulbs of the dry inland area, it is frequently possible where bulbs are growing along the River Murray banks to find a bulb only 9–12 inches below the soil level. Of interest is to trace the depths of bulbs growing on slopes of the river banks. On a billabong the bulbs will be found at a comparatively shallow depth, but as the banks rise the bulbs are found deeper and deeper until they ultimately exceed 2 feet. Periodic flooding of the areas in which the bulbs grow appears to be an important factor not only affecting their growth, but also their distribution.

C. flaccidum in either its white or cream form (and we have now growing at the Garden a comparatively deep cream or almost pale yellow form) is a most attractive species. The leaves, which are deciduous, are bright green and 1–2 inches wide at the broadest part and up to 2½ feet long. They normally lie slightly arched above the ground (Fig. 106). The flower stem is thick and varies between 2–3 feet tall. At its top a cluster of flowers is produced and these number from four to six in young immature bulbs or in bulbs which have not received sufficient water, to mature bulbs which may produce up to eighteen to twenty flowers in a head. In bud they are protected by papery bracts.

It is a species which should do reasonably well in a warm south border in England. It is essential, however, that the site be well drained, especially above the bulb, otherwise rot may occur. We have transplanted mature and immature bulbs and find that they grow best when planted at depths exceeding 12 inches. In Adelaide we have flowered these bulbs quite successfully in 9-inch pots; the top of the bulb in this case was placed just below soil level. However, when this is done, the permanent neck collapses and in its place a very short neck protrudes and gives rise to the straplike leaves which then grow in a more upright manner.

NOTES FROM FELLOWS

More about Transplanting Old Trees

IN the R.H.S. JOURNAL, April 1956, an article about transplanting old trees by W. G. AYRES was printed. The principles outlined in that article are obviously of common interest, and should be strictly followed anywhere, when attempting to transplant old trees. Since moving an old tree is always a costly proposition, the financial aspect of such an undertaking should be carefully calculated as to its purpose. Only trained and experienced personnel will ensure maximum success in carrying out the uprooting and transplanting of old trees.

In the process of such work, particularly with evergreen trees, we have introduced some variations on the methods described by MR. AYRES which may be of interest to planters and gardeners elsewhere.

The ultimate object is to transplant an evergreen tree with as little loss of foliage as possible, thus minimizing disturbance in the life of the tree. For that purpose the preparation of the tree for transplanting takes place at least one year or more in advance. Only strong and healthy trees should be selected. All trees with disfigured crowns, with large wounds in the trunk or with any abnormalities in growth should be discarded.

The steps of preparing an evergreen tree for transplanting are as follows:

(1) Preparatory work can be done at any time of the year, but preferably in spring.

(2) The crown is pruned, reducing the green canopy and the total foliage by approximately one-third. This is a good opportunity to correct the shape of the crown by cutting out narrow crotches and thinning the branches.

(3) The trench excavated around the tree is of a diameter five to six times the diameter of the trunk. The width of the trench 10 inches to 12 inches and the depth 30 inches to 35 inches.

(4) Pieces of board (from a discarded barrel) are then put together around the ball at a distance of 6 to 8 inches from it, and the space between them and the ball filled with either humus, saw-dust, or fine wood-shavings. That material should be firmly packed layer after layer. The boards holding it are tied with two or three wires. The remaining space between the boards and the original soil is filled with earth and rammed, so as to press them towards the ball.

(5) Adequate watering is continued throughout the following season.

(6) Within a year or a year and a half a mass of fine fibrous rootlets form in the medium that surrounds the ball at the ends of the severed roots. At that time the tree can be safely moved without further loss of foliage or damage to the crown. Its establishment in the new place is practically ensured.

(7) The soil is then excavated around the boards, and the tree severed from its heel roots by means of sharp tools or by a strangling steel wire pulled by a tractor and then lifted or pulled out of the hole on rollers. No further pruning of the crown is required at that time.

(8) Once in its new place the tree is freed from the boards, and the hole filled with soil which is rammed firm and watered. Watering should be repeated at least three or four times at fortnightly intervals, and if the season is dry it should be continued at three- to four-weekly intervals till rain comes.

Thus, it seems, that by following the above-described procedure, the shock to the tree is being divided into two major phases: First, the pruning of the crown and severing of all side roots; second, which is of a much lesser influence, the cutting of the tree from its deep roots. After transplanting, new growth is due to follow soon, and further disturbances in the life of the tree are minimal.

Old orchard trees, such as citruses, olives and dates, transplanted in that way came back into almost full production after two or three seasons.

YAACOV SHUR, L.A.

Ashdoth-Yacov,
Jordan Valley,
Israel.

Berberidopsis corallina

This magnificent autumn-flowering climber has done very well with me just outside Oxford at an altitude of 400 feet. On a sheltered west wall, in half shade, it has made a spread of some 10 feet in four years, and, roughly matted in winter, has never suffered from frosts. It is planted in a rather shallow peat-bed over heavy limy soil, and shows no sign of chlorosis which is affecting dwarf rhododendrons planted close by. It needs a good deal of moisture in the growing season, which is usually the autumn. This year, besides opening occasional flowers all the winter, it started into growth very early, and by May 1 had many strong shoots up to 2 feet long. (It is a curious feature of this shrub that only the later shoots twine.) My plant has produced an abundant succession of flowers ever since it became established.

L. GLOVER

Headington,
Oxford.

PLANTS AND PROBLEMS—XXXVI

TREATMENT OF HEAVY SOIL

Question. I have recently moved to Essex and taken a house and garden on heavy clay soil. Although my predecessor did much to improve the state of the ground in winter by laying land drains, the soil is very difficult to work. Can you please make some suggestions for improving its physical condition?

Answer. Generally, it can be said that it is not possible to alter the physical condition of a clay soil to any appreciable extent. Nevertheless, such a soil can be improved quite considerably from the horticultural point of view. As a first move, if the soil is acid this can be corrected by liming, but this must not be overdone and only sufficient applied to give a neutral (*not* alkaline) soil. As a result the particles of soil will flocculate and tend to give a crumb-like structure.

Heavy soils can also be broken up and aerated to a certain extent by digging in generous quantities of rough organic matter like garden compost, partially rotted straw, fallen leaves, peat, and other similar materials. Linked with this, the surface drainage of clay soils can be improved by raking into the top 2 or 3 inches liberal applications of such materials as builders' rubble, sand, ashes (which can often be purchased at a reasonable price from local factories or public institutions) and road grit or road sweepings of any sort.

REMOVING SIDE-SHOOTS FROM SWEET CORN

Question. Would you please tell me if it is advisable to tear off the side-shoots from my sweet corn in order to gain an increase in the number of cobs and to hasten ripening?

Answer. The side-shoots on sweet corn are known as suckers and they should not be removed from the plant. Our experience at Wisley and also controlled experiments elsewhere indicates that the removal of these suckers has no effect on the yield or maturity of the crop.

WISLEY TRIALS, 1957

HEUCHERAS

The Council of The Royal Horticultural Society has made the following awards to heucheras after trial at Wisley, on the recommendation of the Floral Committee A. The number in brackets after the description of the variety was that under which it was grown in the trial.

SCINTILLATION. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd., Bressingham, Diss, Norfolk.) **A.M.** May 29, 1957. Described R.H.S. JOURNAL, **81**, p. 456 (**H.C.** 1956). [1]

GLORIANA. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd., Bressingham, Diss, Norfolk.) **A.M.** May 29, 1957. Plant 7 inches high, 24 inches across, compact and erect, flowering very freely; flower stalk 22 inches long, very erect, inflorescence 7 inches long, 3½ inches diameter; flower ⅛ inch diameter, single, Carmine (H.C.C. between 21 and 21/1). [8]

RHAPSODY. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd., Bressingham, Diss, Norfolk.) **H.C.** May 29, 1957. Plant 7 inches high, 22–24 inches across, compact, flowering freely; flower stalk 24 inches long, strong and upright, inflorescence 6½ inches long, 4½ inches diameter; flower $\frac{5}{16}$ inch diameter, single, Neyron Rose (H.C.C. 623/1). [5]

PERENNIAL LUPINS

The Council of The Royal Horticultural Society has made the following award to a perennial lupin after trial at Wisley, on the recommendation of the Floral Committee A.

The number in brackets after the description of the variety was that under which it was grown in the trial.

ETHEL LOUISE SMITH. (Raised, introduced and sent by Messrs. Bakers Nurseries Ltd., Codsall, Wolverhampton.) **H.C.** May 29, 1957. Plant 2 feet high, 2¼ feet spread, vigorous, not woody; foliage large, medium green; inflorescence 21 inches long, 2¾ inches diameter at base; standard Magenta Rose (H.C.C. 027); wings Claret Rose 021/2. [36]

PAEONIES

The trial of paeonies was started in the spring of 1954, has been added to each year and at the end of March 1957 comprised some seventy-four varieties.

The trial was inspected by a sub-committee of the Floral Committee A on May 29, 1957, and on its recommendation the Council of The Royal Horticultural Society has made the following award to a paeony as a variety for garden decoration.

The number in brackets after the description of the variety was that under which it was grown in trial.

POSTILION. (Raised and introduced by the late Professor A. P. Saunders, and sent by Miss Sylvia Saunders, Clinton, New York, U.S.A.) **F.C.C.** May 29, 1957. Described R.H.S. JOURNAL, **82**, p. 35 (**A.M.** 1956). [41]

DARWIN AND HYBRID DARWIN TULIPS

Ninety stocks of Darwin and hybrid Darwin tulips were received at Wisley in the autumn of 1956 for trial. Sixteen bulbs of each stock were planted on November 13, 1956.

The trial was inspected by a sub-committee of the Narcissus and Tulip Committee on April 11, 24 and May 2, 1957, and on its recommendation the Council of The Royal Horticultural Society has made the following awards to tulips.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Darwin Tulips

ANJOU. (Raised and sent by Messrs. F. Rynveld & Sons, N.V., Hillegom, Holland, introduced by Messrs. Walter Blom & Son Ltd., Coombelands Nurseries, Leavesden, Watford, Herts.) **F.C.C.** April 24, 1957. Plant 10 inches high; leaves broad, slightly spread, medium grey-green; flower stems 12–13 inches tall, stout, rigid; flowers 3½ inches deep, diameter closed 1¾ inches, open 3½ inches, petals inside Mimosa Yellow (H.C.C. 602); petals outside Mimosa Yellow (H.C.C. 602/2) deepening to Mimosa Yellow (H.C.C. 602) at margins. [16]

ELISABETH ERIKSSON. (Raised and sent by Messrs. F. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **F.C.C.** April 24, 1957. Plant 13 inches high; leaves narrow, upright, light grey-green; flower stems 22–23 inches tall, medium size; flowers 3½ inches deep, diameter closed 2 inches, open 4 inches; petals inside Phlox Purple (H.C.C. 632/1) with blotch at base deep blue; petals outside greyish Phlox Purple (H.C.C. 632/1). [64]

SNOWPEAK. (Raised, introduced and sent by Messrs. Konynenburg & Mark Ltd., Noordwyk, Holland.) **F.C.C.** April 24, 1957. Plant 13 inches high; leaves broad, medium grey-green; flower stems 18 inches tall, medium size; flowers 3¾ inches deep, diameter closed 1¾ inches, open 3½ inches; petals inside cream with blotch at base creamy buff; petals outside Mimosa Yellow (H.C.C. 602/2) with pale cream at margins. [4]

ANDALUSIE. (Raised and sent by Messrs. F. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **A.M.** April 24, 1957. Plant 13 inches high; leaves medium width, medium green; flower stems 19 inches tall, stout; flowers 3 inches deep, diameter closed 2¼ inches, open 4½ inches; petals inside Orient Red (H.C.C. 819) with blotch at base deep bright blue; petals outside Orient Red (H.C.C. 819) flushed magenta. [61]

BAYONNE. (Raised and sent by Messrs. F. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **A.M.** May 2, 1957. Plant 15 inches high; leaves broad, grey-green; flower stems 22 inches tall, stout; flowers 3½ inches deep, diameter closed 2½ inches, open 3½ inches; petals inside Petunia Purple (H.C.C. between 32 and 32/1) with blotch at base blue with white at edges; petals outside Petunia Purple (H.C.C. 32/1) becoming greyish towards margins. [74]

EXCELLENT. (Raised, introduced and sent by Messrs. Konynenburg & Mark Ltd.) **A.M.** May 2, 1957. Plant 12 inches high; leaves broad, waved, grey-green; flower stems 21 inches tall, stout; flowers 3½ inches deep, diameter closed 2½ inches, open 3¼ inches; petals inside Crimson (H.C.C. 22) with blotch at base pale creamy yellow; petals outside Rose Bengal (H.C. 25/1). [52]

ELIZABETH ARDEN. (Raised by Dr. W. E. de Mol and Mr. A. H. Nieuwenhuis, introduced and sent by Messrs. Nieuwenhuis Bros., N.V., Welbedrogen, Lisse, Holland.) **A.M.** April 11, 1957. Plant 12 inches high; leaves very broad, light grey-green; flower stems 16 inches tall, stout; flowers 4½ inches deep, diameter closed 2¼ inches, open 3¼ inches; petals inside Vermilion (H.C.C. 18/1) with blotch at base yellow; petals outside a shade near Delft Rose (H.C.C. 020/1) flushed magenta at base; an early-flowering variety. [28]

GEO. H. DICKS. (Raised by Messrs. D. W. Lefeber & Co., Lisse, Holland, introduced and sent by Messrs. Eggink Bros. Ltd., Voorschoten, Holland.) **A.M.** April 24, 1957. Plant 14 inches high; leaves broad, waved, greyish green; flower stems 18 inches tall, slender; flowers 3¼ inches deep,

diameter closed 2¼ inches, open 3¼ inches; petals inside Neyron Rose (H.C.C. 623) with blotch at base white; petals outside Rose Bengal (H.C.C. 25/2). [24]

GOLDEN NIPHETOS. (Introduced and sent by Mr. H. Huyg, Breezand, Holland.) **A.M.** May 2, 1957. Plant 14 inches high; leaves broad, grey-green; flower stems 19 inches tall, stout; flowers 3¾ inches deep, diameter closed 1¾ inches, open 4 inches; petals inside Aureolin (H.C.C. 3); petals outside base of segments Dresden Yellow (H.C.C. 64/3) changing to Aureolin (H.C.C. 3/1) at margins. [11]

NOBEL. (Raised and sent by Messrs. R. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **A.M.** April 24, 1957. Plant 13 inches high; leaves broad, medium-green; flower stems 22 inches tall, stout; flowers 2½ inches deep, diameter closed 2 inches, open 4½ inches; petals inside Orient Red (H.C.C. 819) with blotch at base greenish brown with a narrow margin of yellow; petals outside Orient Red (H.C.C. 819) with centre of petal overlaid Magenta Rose (H.C.C. 027/1). [47]

ONTARIO. (Raised and sent by Messrs. F. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **A.M.** April 24, 1957. Plant 13 inches high; leaves broad, medium-green; flower stems 20 inches tall, medium size; flowers 3¼ inches deep, diameter closed 2¼ inches, open 3¼ inches; petals inside Orient Red (H.C.C. 819/1) with blotch at base bluish green; petals outside, Orient Red (H.C.C. 819) with a greyish mauve bloom. [46]

PANDION. (Raised by Messrs. Segers Bros., Lisse, Holland, introduced and sent by Messrs. Eggink Bros. Ltd.) **A.M.** April 24, 1957. Plant 13 inches high; leaves very broad, greyish-green; flower stems 15 inches tall, stout; flowers 3½ inches deep, diameter closed 1¾ inches, open 4 inches; petals inside Lilac Purple (H.C.C. 031/2) fading towards edges with blotch at base cream; petals outside Lilac Purple (H.C.C. 031/1) edged white. [72]

PERRY COMO. (Raised and sent by Messrs. F. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **A.M.** April 24, 1957. Plant 13 inches high; leaves broad, medium-green; flower stems 17 inches tall, stout; flowers 3¼ inches deep, diameter closed 2½ inches, open 4½ inches; petals inside Cherry (H.C.C. 722/1) with blotch at base cream overlaid greenish blue; petals outside Tyrian Rose (H.C.C. 24/2) changing towards margins to Cherry (H.C.C. 722/2). [32]

REGALIA. (Raised by Messrs. Segers Bros., introduced and sent by Messrs. Eggink Bros. Ltd.) **A.M.** May 2, 1957. Plant 14 inches high; leaves broad, grey-green; flower stems 19 inches tall, stout; flowers 3 inches deep, diameter closed 2 inches, open 5½ inches; petals inside pale creamy white with blotch at base yellow; petals outside cream. [1]

ROYAL GOLD. (Raised, introduced and sent by Messrs. Warnaar & Co., N.V., Sassenheim, Holland.) **A.M.** April 24, 1957. Plant 14 inches high; leaves broad, grey-green; flower stems 18 inches tall, stout; flowers 2½ inches deep, diameter closed 2¼ inches, open 3¼ inches; petals inside Lemon Yellow (H.C.C. 4); petals outside Lemon Yellow (H.C.C. 4/1). [19]

WHITE STANDARD. (Raised, introduced and sent by Messrs. Warnaar & Co.) **A.M.** April 24, 1957. Plant 12 inches high; leaves broad, upright, medium grey-green; flower stems 14 inches tall, stout; flowers 3 inches deep, diameter closed 2½ inches, open 3½ inches; petals inside white with blotch at base creamy buff; petals outside white. [2]

ALSYONE. (Raised by Mr. N. L. A. Roozen, Heemstede, Holland, introduced and sent by Frans Roozen, Vogelenzang, Holland.) **H.C.** May 2, 1957. Plant 13 inches high; leaves broad, very upright and waved, medium-

green; flower stems 18 inches tall, stout; flowers 2¾ inches deep, diameter closed 2 inches, open 4–4¼ inches; petals inside Rose Bengal (H.C.C. 25) at base fading at margins through Rose Bengal (H.C.C. 25/1 to 25/2) with blotch at base creamy yellow touched blue at edges, petals outside Rose Bengal 25/1. [29]

GLADSTONE. (Raised by the late Mr. H. Carlee, Haarlem, Holland, introduced and sent by Frans Roozen.) **H.C.** April 24, 1957. Plant 12 inches high; leaves broad, grey-green; flower stems 9–10 inches tall, stout; flowers 3½ inches deep, diameter closed 1½ inches, open 3–3¼ inches; petals inside Orchid Purple (H.C.C. 31) with blotch at base cream; petals outside Lilac Purple (H.C.C. 031). [71]

REGENCY. (Raised and sent by Messrs. F. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **H.C.** May 2, 1957. Plant 14 inches high; leaves very broad, grey-green; flower stems 20 inches tall, slender; flowers 3½ inches deep, diameter closed 2 inches, open 4 inches; petals inside Blood Red (H.C.C. 820/1) with blotch at base pure white; petals outside Blood Red (H.C.C. 820/1) with greyish bloom. [44]

RITA HAYWORTH. (Raised and sent by Messrs. F. Rynveld & Sons, introduced by Messrs. Walter Blom & Son Ltd.) **H.C.** May 2, 1957. Plant 11 inches high; leaves broad, waved, medium-green; flower stems 16 inches tall, stout; flowers 3 inches deep, diameter closed 2 inches, open 3¼ inches; petals inside Orient Red (H.C.C. 819/1) with blotch at base olive green; petals outside Orient Red (H.C.C. 819/1) with greyish mauve bloom. [60]

SILVER WEDDING. (Raised by Mr. P. J. A. Hulsebos, Leidsevaart 272, Haarlem, Holland, introduced by Messrs. Walter Blom & Son Ltd., sent by Messrs. F. Rynveld & Sons.) **H.C.** May 2, 1957. Plant 13 inches high; leaves medium width, grey-green; flower stems 18 inches tall, medium size; flowers 3½ inches deep, diameter closed 2½ inches, open 3 inches; petals inside Mimosa Yellow (H.C.C. 602); petals outside Mimosa Yellow (H.C.C. 602/3) streaked with Straw Yellow (H.C.C. 604). [10]

SOLO. (Raised, introduced and sent by Messrs. Konynenburg & Mark Ltd.) **H.C.** May 2, 1957. Plant 13 inches high; leaves broad, grey-green; flower stems 19½ inches tall, stout; flowers 3½ inches deep, diameter closed 2½ inches, open 2¾ inches; petals inside Aureolin (H.C.C. 3) with blotch at base dark mustard yellow; petals outside Aureolin (H.C.C. 3/1). [20]

TORGAU. (Raised by Dr. W. E. de Mol and Mr. A. H. Nieuwenhuis, introduced and sent by Messrs. Nieuwenhuis Bros.) **H.C.** April 24, 1957. Plant 13 inches high; leaves broad, grey-green; flower stems 15 inches tall, stout; flowers 3½ inches deep, diameter closed 1¾ inches, open 3 inches; petals inside Magenta (H.C.C. 27/2) fading at edges to Magenta (H.C.C. 27/3) with blotch at base creamy yellow; petals outside Magenta (H.C.C. 27/2) fading at edges to Magenta (H.C.C. 27/3). [37]

Hybrid Darwin Tulips

APELDOORN. (Raised, introduced and sent by Messrs. D. W. Lefeber & Co., Lisse, Holland.) **F.C.C.** May 2, 1957. Plant 14 inches high; leaves broad, grey-green; flower stems 18 inches tall, stout; flowers 3½ inches deep; diameter closed 2¼ inches, open 6 inches; petals inside Signal Red (H.C.C. 719) with blotch at base black with narrow margin of yellow; petals outside flushed magenta with Signal Red (H.C.C. 719) at margins. [79]

HOLLAND'S GLORY. (Raised, introduced and sent by Messrs. D. W.

Lefeber & Co.) **A.M.** April 11, 1957. Plant 14 inches high; leaves broad, medium grey-green; flower stems 19 inches tall, stout, rigid; flowers 5 inches deep, diameter closed 3 inches, open 7 inches, petals inside a glowing shade of Dutch Vermilion (H.C.C. 717/1) with blotch at base greenish brown with narrow margin of yellow; petals outside Dutch Vermilion (H.C.C. 717/3) with centre of segment flushed Magenta (H.C.C. 27/2), an early-flowering variety. [77]

LEFEBER'S FAVOURITE. (Raised, introduced and sent by Messrs. D. W. Lefeber & Co.) **A.M.** April 24, 1957. Plant 12 inches high; leaves broad, medium grey-green; flower stems 19–20 inches tall, stout; flowers 4 inches deep, diameter closed 2½ inches, open 2¾ inches; petals inside Dutch Vermilion (H.C.C. 717) with blotch at base clear yellow; petals outside Dutch Vermilion (H.C.C. 717) overlaid greyish magenta. [85]

WINDSOR. (Raised, introduced and sent by Messrs. D. W. Lefeber & Co.) **A.M.** April 24, 1957. Plant 16 inches high; leaves broad, very upright, grey-green; flower stems 19 inches tall, stout; flowers 4 inches deep, diameter closed 2¼ inches, open 4½–5 inches; petals inside Signal Red (H.C.C. 719) with blotch at base brownish green with broad band of yellow; petals outside Signal Red (H.C.C. 719) overlaid mauvish bloom with extreme base greenish yellow. [90]

OXFORD. (Raised, introduced and sent by Messrs. D. W. Lefeber & Co.) **H.C.** April 24, 1957. Plant 14 inches high; leaves broad, medium grey-green; flower stems 16–17 inches tall, medium size; flowers 4½ inches deep, diameter closed 2½ inches, open 4¼ inches; petals inside Dutch Vermilion (H.C.C. 717) with blotch at base clear bright yellow; petals outside Dutch Vermilion (H.C.C. 717) overlaid greyish magenta with extreme base greenish yellow. [87]

PYRETHRUMS

The Council of The Royal Horticultural Society has made the following awards to pyrethrums after trial at Wisley, on the recommendation of the Floral Committee A.

The number in brackets after the description of the variety was that under which it was grown in the trial.

CRIMSON KING. (Raised and sent by Mr. H. Robinson, M.B.E., Victoria Nursery, Burbage, Hinckley, Leicester.) **F.C.C.** May 29, 1957. Described R.H.S. JOURNAL, 81, p. 456 (**A.M.** 1956). [9]

ROMA. (Raised, introduced and sent by Messrs. Kelway & Son Ltd., Langport, Somerset.) **H.C.** May 29, 1957. Plant vigorous, compact, free flowering; flower stem 3–3¼ feet long, fairly erect; flower 3¾ inches diameter, semi-double, ray florets long, broad, horizontal, Tyrian Purple (H.C.C. 727/1); disc ⅝ inch diameter. [3]

LORNA. (Raised, introduced and sent by Messrs. Kelway & Son Ltd.) **H.C.** May 29, 1957. Plant vigorous, compact, free flowering; flower stem 2½ feet long, erect, stout; flower 3¾ inches diameter, semi-double, ray florets long, broad, horizontal, Tyrian Purple (H.C.C. 727/1); disc $\frac{9}{16}$ inch diameter. [15]

YVONNE CAYEUX. (Sent by Messrs. Kelway & Son Ltd.) **H.C.** May 29, 1957. Plant vigorous, compact, free flowering; flower stem 1¾ feet long, erect, stout; flower 3¼ inches diameter, double, ray florets narrow, margins recurving, short, horizontal, cream, yellow at centre; disc 2¼ inches diameter. [19]

COS LETTUCES

Seventeen stocks of cos lettuces were received for trial at Wisley. The trial was sown under Dutch lights on October 15, 1956, and the seedlings were pricked out on November 9. A second sowing was made a fortnight later in case the plants resulting from the first sowing grew too fast. Air was admitted on all possible occasions to the frames throughout the winter to encourage the production of sturdy plants. The seedlings were planted out in the open on March 13, 1957, the plants being spaced 1 foot apart each way.

The trial was inspected by a sub-committee of the Fruit and Vegetable Committee on June 7, 1957, and on its recommendation the Council of The Royal Horticultural Society has made the following awards to cos lettuces.

The number in brackets after the description of the variety was that under which it was grown in the trial.

LOBJOIT'S DARK GREEN COS. (Raised, introduced and sent by Messrs. Ferry-Morse Seed Co., Mountain View, California, U.S.A.) **F.C.C.** June 7, 1957. Plant 12½ inches high, 14 inches across, upright; leaves medium dark green, slightly blistered; hearts 5¾ inches diameter, yellow, firm, maturing very evenly, fit to cut on June 4. [17]

GRAY PARIS. (Introduced and sent by Messrs. Vilmorin-Andrieux, S A., 4, Quai de la Mégisserie, Paris, France.) **A.M.** June 7, 1957. Plant 14 inches high, 13 inches across, upright; leaves medium grey green, slightly blistered, slightly crumpled; hearts 6½ inches diameter, deep yellow, firm, maturing evenly, fit to cut on June 4. [12]

LITTLE GEM. (Sent by Messrs. J. L. Clucas Ltd., Ormskirk, Lancashire.) **H.C.** June 7, 1957. Plant 7½ inches high, 7½ inches across, very compact, upright; leaves glossy green, blistered, very crumpled; hearts 3½ inches diameter, light yellow, hard, maturing evenly, fit to cut on May 31. [1]

WINTER DENSITY. (Sent by Messrs. J. L. Clucas Ltd.) **H.C.** June 7, 1957. Plant 10 inches high, 10½ inches across, compact, upright; leaves dark green, blistered, crumpled; hearts 3½ inches diameter, yellow, firm, maturing evenly, fit to cut on June 1. [3]

MAMMOTH. (Raised, introduced and sent by Messrs. L. Clause, S.A., Bretigny-sur-Orge, France.) **H.C.** June 7, 1957. Plant 14–15 inches high, 14 inches across, upright; leaves medium green, blistered, slightly crumpled; hearts 5½ inches diameter, light yellow, firm, maturing evenly, fit to cut on June 4. [6]

GREEN PARIS. (Introduced and sent by Messrs. Vilmorin-Andrieux, S A.) **H.C.** June 7, 1957. Plant 17 inches high, 13 inches across, very upright; leaves very dark green, slightly blistered; hearts 5 inches diameter, yellow, firm, maturing evenly, fit to cut on June 2. [8]

ST. BLAISE. (Sent by Messrs. G. R. Vatter Ltd., Bärenplatz 2, Berne, Switzerland.) **H.C.** June 7, 1957. Plant 13 inches high, 13½ inches across, upright; leaves medium green, slightly blistered, slightly crumpled; hearts 4 inches diameter, yellow, firm, maturing evenly, fit to cut on June 6. [11]

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1957

Anchusa 'Loddon Royalist' A.M. May 20, 1957. This very welcome addition to the hardy herbaceous plants is of well-branched, erect habit and grows to a height of 2½ to 3 feet, needing no staking. It is very free flowering and the large flowers are a deep shade of blue near Bluebird Blue (H.C.C. 042) with a small inconspicuous white eye. It is said to flower three weeks before any other anchusa and to be the result of a cross made by Mr. Thomas Carlile between A. 'Feltham Blue' and a seedling. Introduced and exhibited by Messrs. Thomas Carlile (Loddon Nurseries) Ltd., Carlile's Corner, Twyford, Berks.

Anthurium scherzerianum 'Blood Ball' A.M. June 4, 1957. A free-flowering variety of compact habit with large roundish cardinal red spathes measuring 7 inches by 6¾ inches. The colour is slightly deeper than (H.C.C. 822). Raised by Mr. A. Piens, of Ghent, exhibited by Messrs. Sanders (St. Albans) Ltd., Herts.

Anthurium scherzerianum 'Ghent Orb' A.M. June 4, 1957. A remarkable variety with very wide blood-red (H.C.C. 820) spathes measuring 7¾ inches by 8¾ inches. Raised by Mr. A. Piens, of Ghent, exhibited by Messrs. Sanders (St. Albans) Ltd., Herts.

Azara dentata A.M. April 30, 1957. One of about a dozen members of a genus of evergreen Chilean shrubs, *Azara dentata* is hardy against a south wall in Windsor Great Park.

The leaves are alternate, ovate or oval, 1 to 1½ inches long, toothed, deep glossy green above, downy beneath, and bear at the base one or a pair of foliose stipules, giving the appearance of the leaves being arranged in twos or threes.

The fragrant Lemon Yellow (H.C.C. 4) flowers are borne in short branching racemes; there are no petals, the colour of the flowers is derived from the prominent stamens.

Exhibited by the Crown Estate Commissioners, The Great Park, Windsor, Berks.

Begonia 'Mandarin' A.M. May 20, 1957. A large double pale salmon-orange variety with well formed flowers. Raised, introduced and exhibited by Messrs. Blackmore & Langdon, Bath.

Begonia 'Ninette' A.M. May 20, 1957. A very pleasing pale salmon-pink variety having large double flowers with waved petals. Raised, introduced and exhibited by Messrs. Blackmore & Langdon, Bath.

Begonia 'Rebecca' A.M. May 20, 1957. A large clear pink double variety of excellent form. Raised, introduced and exhibited by Messrs. Blackmore & Langdon, Bath.

Begonia 'Red Admiral' A.M. May 20, 1957. A deep Dutch vermilion double variety of large size and good form. Raised, introduced and exhibited by Messrs. Blackmore & Langdon, Bath.

Begonia pendula 'Improved Scarlet Glow' A.M. May 20, 1957. A very useful free-flowering pendulous variety for growing in hanging baskets. The vivid Dutch vermilion (H.C.C. 717) double flowers hang down in clusters. Raised, introduced and exhibited by Messrs. Blackmore & Langdon, Bath.

Dianthus 'Swan Lake' A.M. May 20, 1957, as a variety for exhibition purposes. Flower stems 19½ inches long, very rigid; flowers 2$\frac{3}{10}$ inches diameter, double, centre full, scent good; petals waved, finely serrated, pure white; calyx strong. Shown by Messrs. Lindabruce Nurseries Ltd., Lancing, Sussex.

Lonicera syringantha var. wolfii A.M. April 30, 1957. This is a deciduous shrub, with a gracefully spreading habit. The slender shoots are quite smooth, the dull glaucous leaves are oblong to ovate, the base rounded and the apex broad pointed, in pairs or in threes, ½ to 1 inch long, $\frac{3}{16}$ to $\frac{3}{8}$ inch wide. The fragrant flowers are produced in axillary pairs on stems some ¼ inch long, from the middle joints of the young shoots. The tube of the corolla is ⅓ inch long, slender and cylindrical, has five rounded lobes, which spread to ½ inch wide, and is a pleasing and delicate shade of mauve (Orchid Purple, H.C.C. 31/2).

Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, King's Lynn, Norfolk.

Narcissus 'Rose of May' A.M. May 20, 1957, as a variety for exhibition. Division 4, Double Narcissus. Stem 16 inches long; flower 2⅜ inches diameter; perianth segments 1⅛ inches long, slightly ribbed, margins slightly incurving, pale creamy white. Raised by Mr. G. L. Wilson and shown by Mr. W. J. Dunlop, Dunrobin Bulb Farm, Broughshane, Ballymena, N. Ireland.

Paeonia officinalis anemonaeflora rosea A.M. May 20, 1957. A useful hardy herbaceous plant growing little more than a foot tall and having neat, single, bright carmine flowers measuring 2½ inches across with a central mass of golden stamens. Exhibited by Messrs. M. Prichard & Sons Ltd., Riverslea Nurseries, Christchurch, Hants.

Rose 'Perfecta' A.M. May 20, 1957. A very fine Hybrid Tea variety of excellent form. It was raised by Herr W. Kordes, in Germany, as the result of a cross between 'Spek's Yellow' and 'Karl Herbst'. The large flowers borne on long stiff stems are cream, heavily overlaid and veined with deep pink and with yellow showing at the base of the petals as the flowers open. They have some perfume. The plant appears to be of vigorous and upright growth with dark green shiny foliage and is reported to be very resistant to disease. Introduced and exhibited by Messrs. S. McGredy & Son, Royal Nurseries, Portadown, N. Ireland, and Messrs. Alex. Dickson & Sons Ltd., Newtownards, N. Ireland.

ORCHIDS

Odontoglossum (Ophyras g.) 'Lyoth Regal' A.M. May 20, 1957. This dark-flowered cultivar was exhibited with a spike bearing ten large

flowers each 4 inches by 4 inches. The tepals have strongly undulating margins and the labellum especially is rather fimbriate also. The latter tepal is strongly cleft but the others have a pronounced apical mucro. The general colour is a deep plum purple. The outer tepals have a very narrow whitish margin, whilst the inner tepals have a broad margin of pale mauve widening towards the apex. The crest is pale yellow with two forks at the front. The parentage is O. 'Opheon' and O. 'Palmyras Queen'. Exhibited by Messrs. Charlesworth & Co. Ltd., Haywards Heath.

Odontoglossum (Perryanum g.) 'Lyoth Empress' A.M. June 4, 1957. This cultivar was obtained by crossing O. 'Camilla' and O. 'Toreador'. The plant exhibited had nine large flowers borne in two ranks. Each flower was about 4 inches by 4 inches in width and height. The tepals are strongly undulating and recurved whilst the labellum is finely erose towards the apex as well. The basic colour is white or pale mauve, but in the centre of each tepal is a large purplish blotch. The tepals of the outer whorl are more heavily marked than the others. The labellum is clear white in its lower half with a brownish-purple blotch above. The crest is forked and an area of yellow surrounds it. Exhibited by Messrs. Charlesworth & Co. Ltd., Lewes Road, Haywards Heath.

BOOK NOTES

"Native Plants for Californian Gardens." By Lee W. Lenz. 166 pp. Illus. (Rancho Santa Anna Botanic Garden, Claremont, California.) $3.85.

Although at first glance the title would seem to indicate that the contents of this attractive little book would have a limited appeal for British gardeners, it has proved quite the contrary. The author in his opening chapters has with brevity and quite exceptional clarity written a highly informative account of the botanical characteristics of the Californian flora. His geographical survey of that vast state, giving a fine picture of the varied climate, rainfall, soil and other factors, makes a useful background for the chapters which follow on the uses of native plants in gardens and on their handling and propagation. We at once find ourselves confronted by a bewildering number of old friends which we have grown in our gardens for so long that we tend to forget their Californian origin. There are fine shrubs like *Carpenteria californica*, *Romneya coulteri*, *Ribes sanguineum*, and, of course, the lovely members of the genus *Ceanothus*. Herbaceous plants include *Zauschneria californica*, *Heuchera maxima* and *Iris douglasiana*. The native species of genera like *Eschscholtzia*, *Godetia* and *Clarkia* are, of course, the parents of some of our finest hybrid annuals, and bulbs are represented by lovely species of *Brodiaea*, *Lilium* and *Calochortus*.

The chapter on early botanical and horticultural collectors is so intimately bound up with the history of the Horticultural Society of London, later The Royal Horticultural Society, and names of collectors like Douglas, Menzies, Hartwegg and Lobb as well as firms like James Veitch & Sons and Wallace & Sons, that we realize the great part the Old World played in introducing and assessing the horticultural merits of the new Californian flora, which perhaps were not until much later to be appreciated fully by the gardeners of that state.

The second part of the book is devoted to descriptions and practical comments on distribution, propagation and horticultural uses of the more important species. Each of these is illustrated with a monochrome portrait. There are as well illuminating bits of information as to the first collection and introduction of the plants with not only quotations from *The Gardeners' Chronicle*, *Curtis's Botanical Magazine* and our own JOURNAL but from distinguished British botanists like Lindley and Balfour as well. It

is this broad comprehension of the importance of the Californian flora in international horticulture as well as in the state where it is endemic which Mr. Lenz conveys so admirably. He has an extraordinarily broad knowledge of both botany and horticulture and has the ability to present his ideas in a simple lucid style.

LANNING ROPER

"Fundamentals of Horticulture." Second Edition. By J. B. Edmond, A. M. Musser and F. S. Andrews. 456 pp. Illus. (McGraw-Hill Book Co., New York and London.) $6.75.

The appearance of a second edition six years after the original shows that this book has met a real demand, at least in the United States for which it is primarily intended. Nevertheless, so much of the contents is of such general interest that it might well serve as a text-book for certain purposes in this or any other English-speaking country. Its title is, for once, truly descriptive, since the book does approach the subject from the fundamental viewpoint and attempts, as its authors claim in the preface, to answer the question "Why?" rather than "How?".

The volume is divided into three parts: Part I is a review of plant growth and development in the widest sense. While the treatment is mainly physiological there is sufficient morphology and anatomy to make the principles of plant structure clear to the non-botanist. Incidentally, it is the first elementary text-book in the reviewer's knowledge which explains the phenomenon of "osmosis" (a word which might well be deleted from the language) simply and correctly in terms of the concentration of water molecules. Part II is an account of the principal horticultural practices and here, of course, we find occasional divergences from accepted methods in this country. The chapter on pests and diseases is, perhaps, of least use to a British student since only a few of the organisms dealt with are common to both countries. However, as a general survey of practice in terms of principles this part of the book is still of considerable value. Part III deals with the chief horticultural crops and includes, besides the full range of temperate crop plants, many of subtropical cultivation such as the citrus fruits, tung, avocado and sweet potato.

The field covered is so wide that inevitably the treatment is superficial and the book would be inadequate for an advanced student. For the elementary student or for the enquiring layman who wishes to get a deeper general understanding of the science underlying the practice of horticulture, the book can confidently be recommended. Its production and format is of the standard to be expected of the publishers; it is a pity that the price has to be so high.

R. H. STOUGHTON

"Chrysanthemums in Pictures." By John Woolman. Demy 8vo. Illus. 125 pp. (Gifford.) 13*s.* 6*d.*

Mr. John Woolman has written several books on chrysanthemums, but I would venture to suggest that this is his best one so far.

His knowledge of this very popular flower is well known throughout the world, as he was brought up amongst chrysanthemums from a very early age and has devoted most of his life to the growing of them.

Mr. Woolman has also turned his attention to the raising of new varieties, both for indoor and outdoor cultivation, which has resulted in several good varieties coming on to the market. In this publication the writer has covered all sections of the flower, and has accompanied them with some very good black-and-white and coloured illustrations of the various types. This I consider should prove to be of immense value to readers who are just commencing the growing of chrysanthemums, as this will assist them to understand the various sections of the flower.

The general cultivation is also well covered, which in turn deals with the pests and diseases together with the treatment that is required to destroy and cure them. The book, in fact, covers every aspect of chrysanthemum-growing, and should prove an excellent guide for the amateur grower.

STUART OGG

"Garden Work for the Week." Edited by A. G. L. Hellyer. 129 pp. Illus. (Collingridge.) 7*s.* 6*d.*

It pays to do any job the right way and in the case of garden work it is very often quicker, as if garden jobs are hurried, they frequently have to be done again—in fact,

to get the best results plants must be given the best treatment. In this book half of each page is given to line drawings which show clearly how many jobs are best done, and the remaining half-page to short explanatory notes. The drawings were chosen from *Amateur Gardening*, and operations such as double digging, planting, training melons, rose budding, earthing celery, etc., are described in the order in which they will need to be done in the season.

"Sweet Peas for Exhibitor and Market Grower." By Roy Genders. 156 pp. Illus. (John Gifford, 1957.) 16*s*.

During the twelve years following the war, I would imagine more books have been written on horticulture than during any similar period. But during this time I can recall reading only three books on sweet peas; these were by the Rev. D. Gourlay Thomas, Mr. C. W. J. Unwin (a revised edition of his pre-war book) and Mr. E. R. Janes. Now we have *Sweet Peas for Exhibitor and Market Grower*, by Roy Genders. Mr. Genders writes in a most engaging manner and I found his short history of the sweet pea at the beginning of the book of great interest.

In my opinion the book will prove of greater interest to market growers than exhibitors, as I doubt if there is enough detail to satisfy the insatiable thirst of the modern exhibitor.

In the chapter "Marketing the Bloom", which one feels should have been "Exhibiting the Bloom", the author incorrectly states that the National Sweet Pea Society was formed in 1911 instead of 1900 and that Lady Northcliffe was the Society's first President, whereas she was the ninth.

The book has good illustrations, some coloured, although the choice of an exhibition arrangement is unfortunate, for two of the lower blooms are completely dead.

P. C. M. DAVIS

"Handbook on Broad-leaved Evergreens." Demy 8vo. 99 pp. Illus. (Brooklyn Botanic Garden.) New York, U.S.A. $1.

This useful handbook has been edited by Mr. Brian Mulligan, the Director of the University of Washington Aboretum at Seattle, and he has mustered a long list of contributors from varying geographical regions. A broad-leaved evergreen is differentiated from those conifers with needles such as pines and spruces, which are referred to as narrow-leaved evergreens. Curiously, heathers are included among the broad-leaved evergreens. The value of these as permanent plantings in the garden is rightly stressed and the descriptive list of the thirty best broad-leaved evergreens is not so very distinct from a list which might be compiled for this country, although probably few gardeners here would pay so much attention to the various hollies and to ivy. In this connection the special article on hollies will be of interest, since many of these are at present little known in this country. While primarily compiled for American conditions this little handbook should undoubtedly be of use to English growers as well and will provide some new ideas on the use of particular plants.

PATRICK M. SYNGE

"Soils and Manure for Fruit." Bulletin No. 107. 41 pp. Illus. Min. of Agriculture, Fisheries and Food. (H.M.S.O.) 3*s*. 6*d*.

This bulletin has been entirely rewritten and revised from the original bulletin published in 1937. Prof. T. Wallace of Long Ashton Research Station is again the author. The bulletin should be of the greatest help to all fruit growers, both amateur and commercial, and the clear photographs and descriptions of the results of particular mineral deficiencies and of growth on different soils should enable many growers to plan their fertilizer programme and also to choose profitably sites for new plantations. In this the results of the recent surveys of fruit soils have been taken into account and have enabled some useful conclusions to be drawn. They have shown particularly how important it is to plant on a good and suitable soil, the different fruits each having their own requirements.

"ABC of Flower Gardening for Cyprus." By Lady Murphy. 58 pp. Illus. (Times of Cyprus.) 150 mils.

This little book is arranged month by month according to the gardening operations possible in an island with a long, hot and dry summer. Lady Murphy has obviously

had considerable practical experience and so her book should be a great help both to those beginning to garden in the island and also to those more experienced. It is emphasized that gardening experience in other countries does not necessarily apply in the same way in Cyprus. It is good to note Lady Murphy's advocacy of some of the beautiful native bulbs and corms of Cyprus such as the wild cyclamen. It is to be hoped also that the occasion of a reprint may enable the author to correct the larger part of a rather plentiful crop of small spelling inconsistencies and errors. The name *Amaryllis* is best confined to the autumn-flowering Belladonna lilies, while *Hippeastrum* should be applied both to the scarlet and the large trumpet pink-and-white spring-flowering "lilies" mentioned.

PATRICK M. SYNGE

"Gladioli and Dahlias." By Charles W. J. Unwin. Cr. 8vo. 126 pp. Illus. 2nd revised ed. (Collingridge.) 10*s.* 6*d.*

The first edition of this useful little book was published in 1949, but apart from *Chrysanthemum* there are probably few genera in which breeding and development has been more pronounced in recent years than in *Gladiolus* and *Dahlia*. Mr. Unwin has grown both of these on a large scale and his experience has been used in this book. In each case he devotes a chapter to the cultural requirements, particularly those for fine exhibition flowers and he also gives lists of recommended varieties. This is a practical book with much sound advice and should be helpful to growers of both gladioli and dahlias.

PATRICK M. SYNGE

"The Observer's Book of Garden Flowers." Compiled by Arthur King. 240 pp. Illus. (Warne & Co. Ltd., 1957.) 5*s.*

This series is well known and needs little or no introduction and like its companion books this one is remarkably good value for money. Two hundred of the most useful annuals, biennials and perennials are briefly described, together with outline descriptions of propagation and cultivation. Every plant is illustrated, half of them in colour, and there is also a good, short, introductory chapter and illustrated glossary which will help keen young gardeners and amateurs.

"Food from Gardens and Allotments." Min. of Agriculture, Fisheries and Food. 32 pp. Illus. (H.M.S.O.) 2*s.* 6*d.*

There is at the present time a very real interest in allotment gardening throughout the country and this booklet aims at keeping alive and increasing this interest. Not only is it concerned with the production of fruit and vegetables but also with the keeping of small livestock such as pigs, poultry, rabbits, goats and bees. Organizations which are interested in these particular subjects are listed, so also are useful publications; both these appendices will be of great help and interest.

"How to Grow Good Delphiniums and How to Increase your Favourites." By Ronald Parrett. 32 pp. Illus. (The Delphinium Society.) 2*s.* 6*d.*

Mr. Parrett tackles the subject from the beginning and gives reasons why the "murdering" method of division is not to be encouraged. The reader is led step by step through the process of selecting, preparing, inserting and rooting the cuttings. Particular attention is paid to the last stage which is a critical one for these soft cuttings. An exceptionally good series of sixteen photographs illustrates this section and stresses the salient points. The second article is concerned with the planting and annual cultivation of delphiniums and contains much useful information.

G. E. PETERSON

"All Grows Well." By Fred Loads. 161 pp. Illus. (Jeyes' Fluid Compounds Co. Ltd.) 4*s.* 6*d.*

This is a useful little booklet containing a surprising amount of practical information considering its size. All sections of the garden are dealt with in a clear and concise way and readers may rely on Mr. Loads' advice as he has had many years of experience.

"Climbing Plants for Your Garden." By Douglas Bartman. 80 pp. Illus. (W. & G. Foyle Ltd., 1956.) 3*s*.

This small book, arranged under the four seasons of the year, sets out to introduce to readers the well known and lesser known climbing plants as well as those which are suitable for training against walls and trellises. The particular needs of the plants are pointed out where necessary and indeed the book should be useful to many gardeners.

"Flower Arrangement in the Church." By Katherine M. McClintock. 115 pp. Illus. (The World's Work Ltd.) 12*s*. 6*d*.

The author of this little book makes no pretence of writing about anything horticultural, but has given us many useful and informative details of how decorations in churches should be carried out on their various occasions and what particular colours should be used for them. A table of liturgical colours used in ancient times by the Church of England and a table of what flowers to use at each season will be of much help to those who desire to decorate correctly. Photographic illustrations indicate how this should be done. Opposite page 21 the altar of Holy Trinity, New York, has a completely satisfactory arrangement which carries on the oval lines of the mosiac reredos. Opposite page 69 a well designed bowl of flowers is sedately pleasing, and opposite page 84 a very attractive fan of wheat is set up as a background to the cross on the altar for a harvest service. There are many valuable hints pointed out and amongst them the unsuitability of too small flowers. One illustration shows the excellent effect of tall arrangements on either side of the chancel.

FRANK GALSWORTHY

"Roses." By L. A. Anstiss, H. P. Champneys, W. S. Brett, C. E. Pearson, and R. C. M. Wright. 160 pp. Illus. (Ward, Lock & Co. Ltd.) 15*s*.

This book is quite a good guide for the rose grower and deals adequately with the various problems and cultural operations which present themselves to the beginner.

As is to be expected of a book written by so many contributors the subject matter is dealt with in a somewhat illogical manner. For example, the section on planting, care and maintenance would have been better placed after, rather than before, the section on soils and planning, and certainly after the section on digging. Had the arrangement been watched more closely it would not have been necessary to deal with planting on pp. 33–35 and again on pp. 67–68.

The three-colour plates are good, but it is unfortunate that the caption on the plate facing p. 96 wrongly places 'Comtesse Vandal' and 'Peace'. The photographic plates clearly illustrate the various processes they are meant to depict but they would have been more valuable had they been placed nearer the text they were meant to illustrate.

There is much helpful advice in the book and several chapters, e.g. Breeding new varieties, Exhibiting, and Pests and Diseases will be more helpful to the more experienced rose growers.

The list of roses of various types given in chapter ten is quite adequately comprehensive and contains many of the newer varieties as well as the species and older roses.

F. FAIRBROTHER

"American Rose Annual 1957." Edited by Frank H. Abrahamson. 264 pp. Illus. (American Rose Society.) $3.

A most interesting publication, particularly for American readers. Many of the articles are more suited to the professional growers but the amateur can find some useful information in the articles written in lighter vein. The article "What's in the bag", gives some much-needed information of the formulae given on a bag of fertilizer which will be much appreciated by the less scientific readers.

The colour plates are not quite up to the standard one would expect in a publication of such importance.

F. FAIRBROTHER

"Tropical Plants and their Cultivation." By L. Bruggeman. 227 pp. + 292 coloured illustrations. (Thames & Hudson, 1957.) 63*s*.

This book is based on the same author's *Indisch Tuinboek*, originally published about twenty years ago as a guide to ornamental gardening in Java, and includes the

same series of beautiful and finely reproduced coloured illustrations from water-colours by Ojong Soerjadi. The text has been little changed, apart from deletion of the introductory section and of some of the species (especially such as are less suited to greenhouse cultivation) and the addition of brief cultural directions for those who may wish to grow the species in question in the less hospitable British climate. These cultural notes, and an introduction of four pages, are contributed by Mr. W. M. Campbell, Curator of the Royal Botanic Gardens, Kew.

To serve the dual purpose which Mr. Campbell claims for the book in his introduction, it would have been better to revise the text. The grower in Britain would have welcomed reference to other beautiful tropical plants which can be grown in greenhouses in this country but do not happen to have been cultivated in Java. From the point of view of the tropical gardener, the book loses in value by lack of reference to recent developments in ornamental tropical gardening, for example, the many perpetual-flowering garden orchids and the new hybrid bougainvilleas.

There is nothing to indicate that the text was originally written for gardeners in Java, though the frequent statements as to altitudes suitable for particular species can only be understood if that fact is borne in mind. The illustrations are by far the best part of the book, and they are excellent. The book is admirably printed and produced in an attractive binding.

R. E. HOLTTUM

Amateur Gardening Handbooks: No. 20, "Raspberries and Loganberries", by H. M. Hughes and No. 25, "Border Carnations", by J. H. W. Galbally. 92 pp. Illus. (W. H. & L. Collingridge Ltd.) 4*s*. each.

The first of these little books covers the subject adequately and the clear pruning and training diagrams should help readers. Soft fruits always repay generous treatment and the author has emphasized this; she has also given reasons for the practices advocated and which always makes gardening books more helpful. In the second book much will be found to interest the reader who just wishes to have colour in the garden as well as the reader who is keen on exhibiting this increasingly popular member of the Dianthus family. Outdoor and indoor cultivation are included together with chapters on propagation, showing also a comprehensive list of varieties suitable for various purposes.

The following books have been received:

"Hop Growing and Drying." Bulletin No. 164, Min. of Agriculture, Fisheries and Food. 60 pp. Illus. (H.M.S.O., 1956.) 5*s*.

"Laboratory Methods of Work with Plant and Soil Nematodes." Technical Bulletin No. 2, Min. of Agriculture, Fisheries and Food. 47 pp. Illus. (H.M.S.O.) 3*s*. 6*d*.

"Sitka Spruce in British Columbia." By W. R. Day, B.Sc., M.A. Forestry Commission Bulletin No. 28. 110 pp. Illus. (H.M.S.O., 1957.) 20*s*.

ERRATUM

R.H.S. JOURNAL, **82,** July 1957: page 315. The author of "The Housewife Book of House Plants" reviewed on this page is Mrs. Xenia Field, and not Miss Zenia Field as stated, and the publishers are the Hulton Press.

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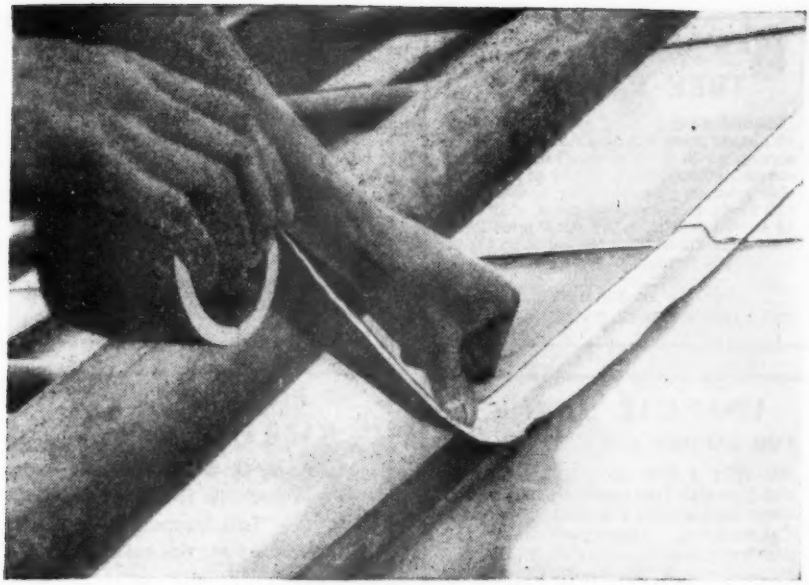

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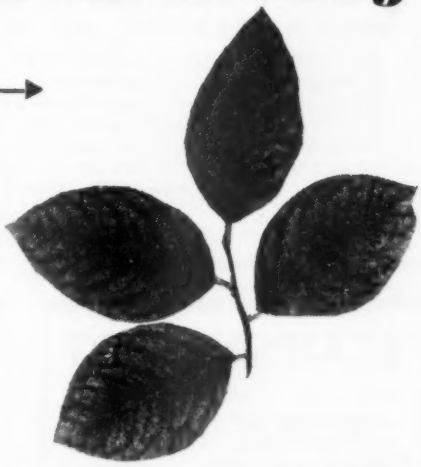

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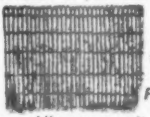

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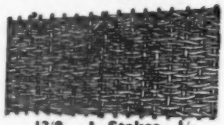

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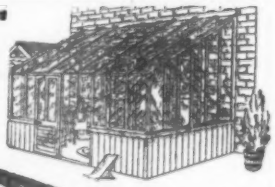

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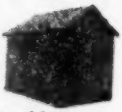

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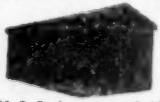

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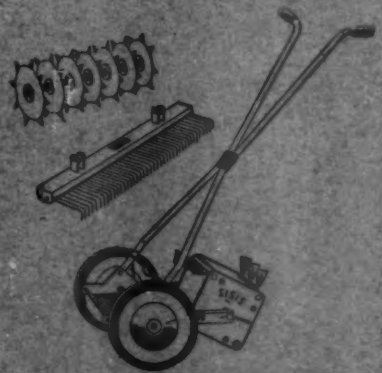

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